VOL. XXIV NEW YORK—THURSDAY, JANUARY 19, 1911—CHICAGO No. 3

THE AUTOMOBILE

SHOW SEASON IN FULL SWING

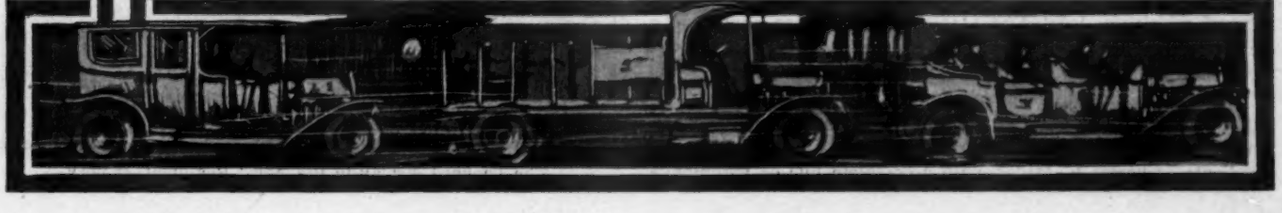
THREE big shows at Philadelphia, Detroit and Milwaukee and the truck section of the A. L. A. M. show at Madison Square Garden are the features of the current week in motordom. The season of exhibitions has proved wonderfully successful so far from every possible point of view. Public interest has been keener than ever before and the lines of motor cars and accessories displayed are more complete and perfect than at any previous period. The most notable feature of the shows this season is the extraordinary interest centered upon the trucks by the merchants of the United States. They are attending as a matter of vital business.

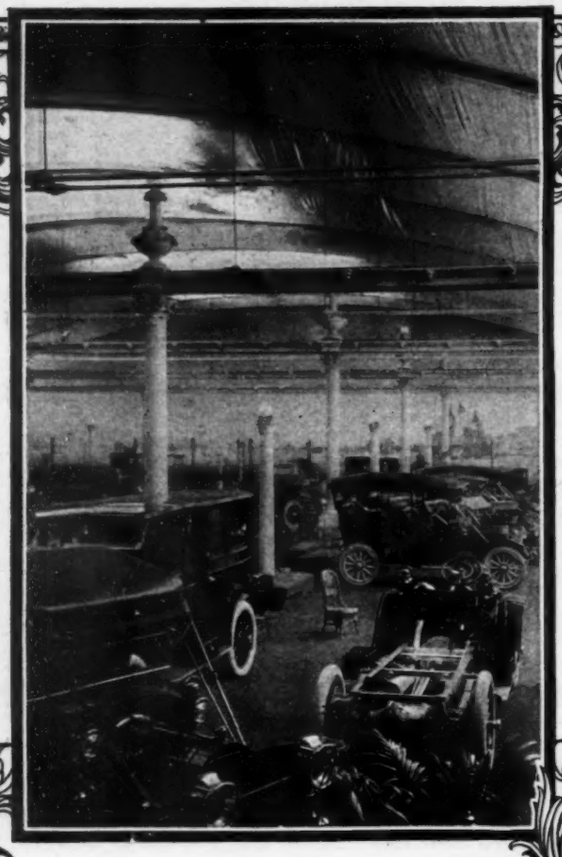
Philadelphia's Two-Building Show Opens Successfully

PHILADELPHIA, Jan. 14—Simultaneously and without ostentation at 8 o'clock this evening the Tenth Annual Show opened in the First and Third Regiment Armories, presenting a scene that outrivaled all previous efforts in this line and setting a standard for beauty and displays that will be the subject of favorable comment long after the doors are closed on Saturday night week. Though this year's show is the tenth in as many years, it is notable for two differences from any heretofore held: first, it is made up exclusively of cars manufactured and sold under the Selden patent, and, secondly, it marks the initial effort of the Philadelphia Licensed Automobile Dealers' Association, a young and ambitious association that includes local agents and manufacturers' representatives of all machines sold under the Selden patent.

Despite a chilly drizzle which fell intermittently throughout the day the dyed-in-the-wool motor enthusiasts attended in force and besieged the various booths, seeking first-hand enlightenment on the improvements which, while offering no radical departures, mark the 1911 models. Broad street, both north and south of the City Hall, presented a scene that demonstrated forcibly the magnitude of the attraction, the vicinity of the armories presenting a line-up of cars that foretold an attendance exceeding that of any former opening night of the exhibition. Especially was this true in the neighborhood of the First Regiment Armory, Broad and Callowhill streets, which structure is situated in the heart of Automobile Row.

As to the exhibition itself, nothing was left undone to make it attractive to exhibitor and patron alike. The interior of the Third Regiment Armory, Broad and Wharton streets, presents a scene that at once commends itself to the eye of the visitor. The general idea has been to depart from the conventional, and the bare, blank walls and girders have been transformed into a representation of Venice, the scheme being carried out in exquisite taste and with artistic conception. That the effect might not be lost, the whole bare roof is covered with "sky." The aisles are marked by columns, on which rest potted plants.





THIRD REGIMENT ARMORY, LOOKING EAST

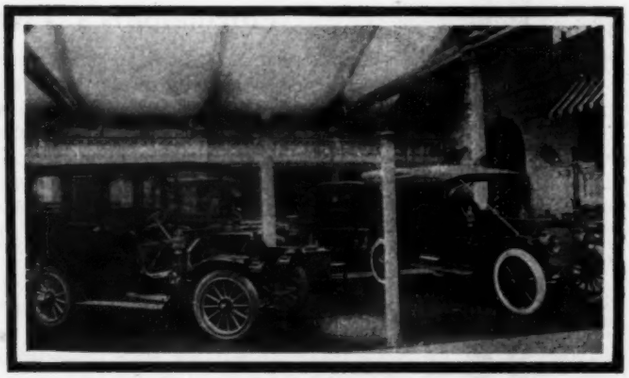
SHOWING HANDSOME DECORATIVE EFFECTS

The columns supporting the "sky" are topped with lights, the color scheme being carried out in white.

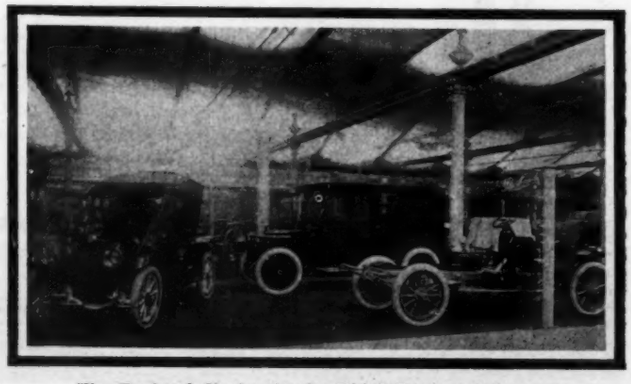
No less novel was the scene presented at the uptown armory, the same out-of-the-ordinary clever manipulation of the decorators being manifest. As at the Third Regiment all unsightly woodwork has been completely eliminated, and the interior marked by a simplicity that heightens the general effect, being in the nature of a corridor, all in white. As at former exhibitions concerts, afternoons and evenings, by the regimental bands will be a feature.

The First Regiment Armory is given over to gasoline pleasure cars, while the Third houses gasoline pleasure cars and accessories. More attention and space have been allotted to the accessories department of the show than in previous years, this section being one of the most elaborate ever seen in the Quaker City, occupying the entire space along the southern and eastern walls. It will remain throughout the entire two weeks of the show. Next week the First Regiment show closes and the pleasure cars in the Third give way to motor trucks and vehicles and electric cars.

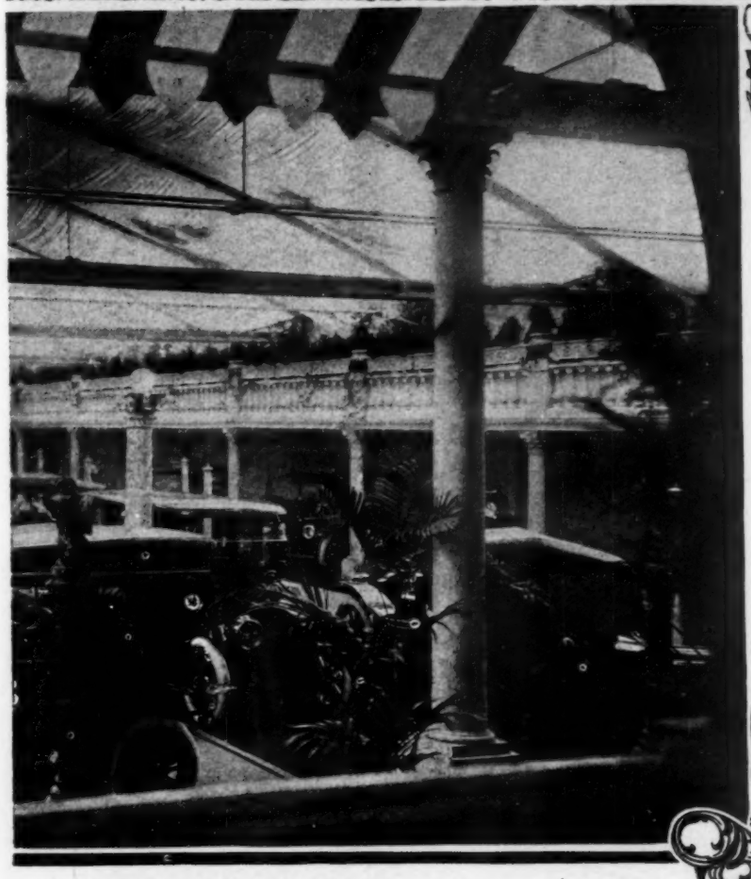
Refinements in accessories that perhaps offer no plainly discernible external changes, but that add immeasurably to safety and convenience, are a feature. An exhibit that attracted interest was the demonstration of the Flentje hydraulic jounce and recoil preventer, an ingenious device for the absorption of shocks. The Reagan Non-Skid Company, the Philadelphia quarters of which are located at 1341 Arch street, are exploiting a new non-skid chain so constructed that a machine may be run over snowy, muddy or wet roads and streets with impunity. The Hydraulic Oil Storage Company, 611 Morris building, is interesting visitors with its hydraulic system of gasoline storage, showing an air-tight tank delivering gasoline free from foreign ingredients. Charles E. Miller, with a complete line of automobile



Pullman and other exhibits in Third Regiment Armory

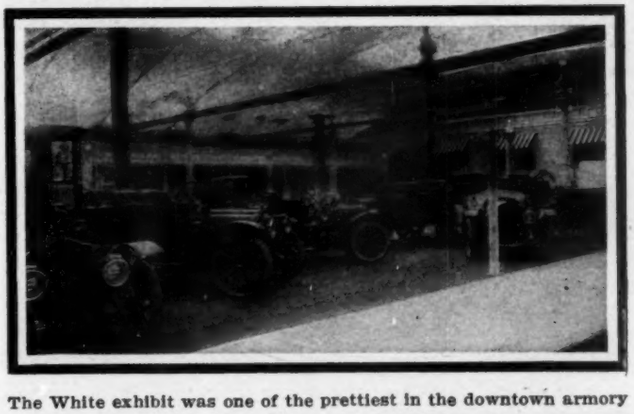


The Packard display in the Third Regiment Armory

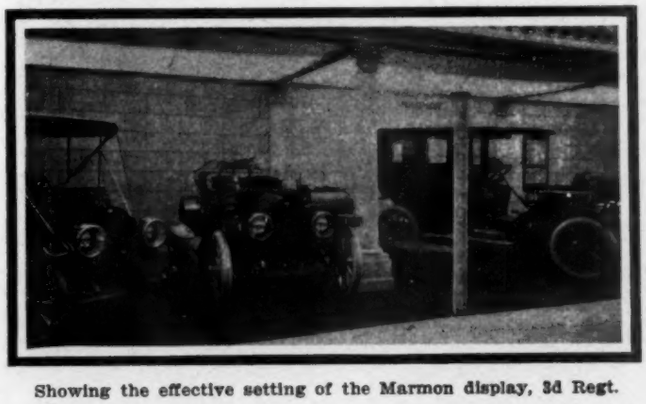


IN THE THIRD REGIMENT ARMORY

THIRD REGIMENT ARMORY, SOUTH AISLE



The White exhibit was one of the prettiest in the downtown armory



Showing the effective setting of the Marmon display, 3d Regt.

supplies; the Auto Equipment Company, automobile accessories; the Auto Wind Shield Company, wind shields; the Auto Tire Preserver Company; S. F. Bowser & Company, tanks and pumps; J. Eavenson & Son, Camden, soaps and greases; the Asbestos Brake Lining Company; the Howard Demountable Rim Company, demountable rims; the International Correspondence Schools, of Scranton, Pa.; the Keim Supply Company, automobile accessories; the Keystone Lubricating Company, oils and greases; J. H. McCullough & Son, automobile accessories; the Philadelphia Storage Battery Company, batteries; the Manufacturers' Company; the Penn Auto Supply Company, automobile accessories, and the Parker Autolock Company are all represented this feature of the show forming Sections A and H.

Sections B, C, D, E, F and G are composed of the gasoline pleasure cars, the following cars and exhibits being on view:

Alco—These cars are manufactured by the American Locomotive Co. and are exhibited at the Third's Armory by the Longstreth Motor Car Co., 257 North Broad St. This line comprises two models of chassis with different styles of coach-work. With touring bodies the four-cylinder model with a motor 5 1-8 inches bore and 5 1-2 stroke is listed at $4,500 and the six-cylinder model with a bore of 4 3-4 and 5 1-2 inch stroke at $6,000. The cylinders are cast in pairs and the lubrication is effected by pump, the clutch and the transmission is of the selective type giving four speeds; the final drive is by shaft.

Brush—These cars are manufactured by the Brush Runabout Co., Detroit, Mich., and are exhibited by the Oxford Automobile Co., 518 N. Broad St., at the Third's Armory. One model single-cylinder is made selling at $450, with runabout body. An inside drive coupé is also marketed at $850. The cooling is through honeycomb radiator and thermo-syphon. Multiple disc clutches are fitted for high and low speed as well as reverse and the final drive is by double side chain. The springs are spiral,

located at extreme four corners and the frame is of the armored wood type.

Buick—These cars are manufactured by the Buick Motor Co., Flint, Mich., and are exhibited at the First's Armory by the Buick Motor Co., 237 N. Broad street. This line comprises eight models ranging in price from $800 to $1,850. Planetary transmission is fitted to models 32 and 33. The remainder have selective types and the final drive in all cases by shaft.

Cartercar—These cars are manufactured by the Cartercar Co., of Pontiac, Mich., and are exhibited by the Johnson Motor Car Co., 326 North Broad street, in the First's Armory. This line comprises ten models ranging in price from $1,050 to $1,650. The transmission is by friction and the final drive by double chain.

Autocar—These cars are manufactured by the Autocar Company, Ardmore, Pa., and are exhibited at the Third Regiment Armory by the Autocar Company, of 249 North Broad street. This line comprises two models, both selling at $2,250. The motor is of the four-cylinder type. 4 3-8 inch bore by 4 1-2 inch stroke. Multiple-disc clutch and selective type transmission with a final drive by shaft are fitted and the engine lubrication is of the forced feed type.

Chadwick—These cars are manufactured by the Chadwick Engineering Works, of Pottstown, Pa., and exhibited by the Chadwick company, of 254 North Broad street, at the Third's Armory. This line comprises four models ranging in price from $5,500 to $6,500 and are all of the six-cylinder type. The clutch is of the internal expansion type; selective four-speed transmission is used with double-chain final drive. The motor has a bore of 5 inches and a 6-inch stroke.

Chalmers—These cars are manufactured by the Chalmers Motor Company, Detroit, Mich., and exhibited by Chalmers-Hipple Motor Company, Broad and Vine streets, at the Third's Armory. This line comprises eight models, ranging in price from $1,500 to $3,000. The two models of chassis are known as the "30" and "40." The cylinders of the "30" are cast en bloc and the "40" in pairs. The bore of the "40" is 5 inches and the stroke 4 3-4 inches, with enclosed valves. Both types are shaft-driven.

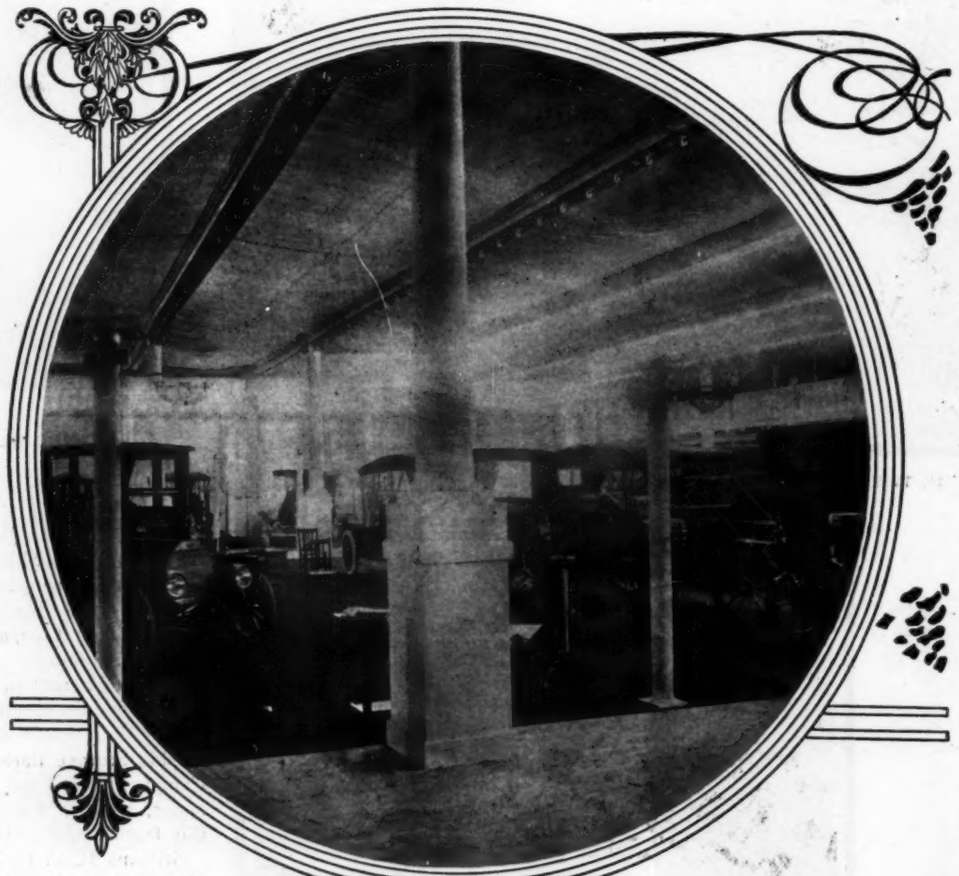
Columbia—These cars are manufactured by the Columbia Motor Car Company, Hartford, Conn., and are exhibited by the United Motor Philadelphia Company, of 207 North Broad street, at the First's Armory. This line comprises seven models, ranging in price from $2,750 to $4,800. The motors in all cases are four-cylinder with pump lubrication. Cone clutch and selective type transmission is used with shaft drive.

Courier—These cars are manufactured by the Courier Car Company, Dayton, O., and are exhibited at the First's Armory by the Stoddard-Dayton Auto Company, of 253 North Broad street. This car is now known as the Stoddard-Dayton "20" and closely follows the lines of the other models of this car.

Elmore—This car is manufactured by the Elmore Mfg. Co., Clyde, O., and exhibited at the Third's Armory by Gawthrop & Wister, of 242 North Broad street. This line comprises four models, ranging in price from $1,200 to $2,500. The motors of these cars are of the two-cycle type with individual cast cylinders. Thermo-syphon cooling is employed and the lubrication is by pump. The transmission is located in the motor casing as well as the disc clutch.

E-M-F—These cars are manufactured by the E-M-F Company, Detroit, Mich., and are exhibited at the First Regiment Armory by Studebaker Brothers Company, of Eighteenth and Noble streets. The line comprises one model with different styles of coach work, the touring model selling for $1,000, and known as the E-M-F "30." The "20" model is the Flanders, which sells as a roadster for $700. Both cars have similar characteristics with the exception that the cylinders of the Flanders are cast en bloc, while those of the E-M-F are cast in pairs.

Everitt—These cars are manufactured by the Metzger Motor Car Company, Detroit, Mich., and exhibited at the First Regiment Armory by W. Wayne Davis Company, of Broad and Green streets. This line comprises one model with different styles of coachwork, all selling at $1,350. The cylinders are cast en bloc and the bore is 4 inches and the stroke 4 3-4 inches. The clutch is of the leather cone type, and a selective transmission giving three speeds forward and reverse located on the rear axle is used.



GENERAL APPEARANCE FROM TWO POINTS OF VIEW OF THE

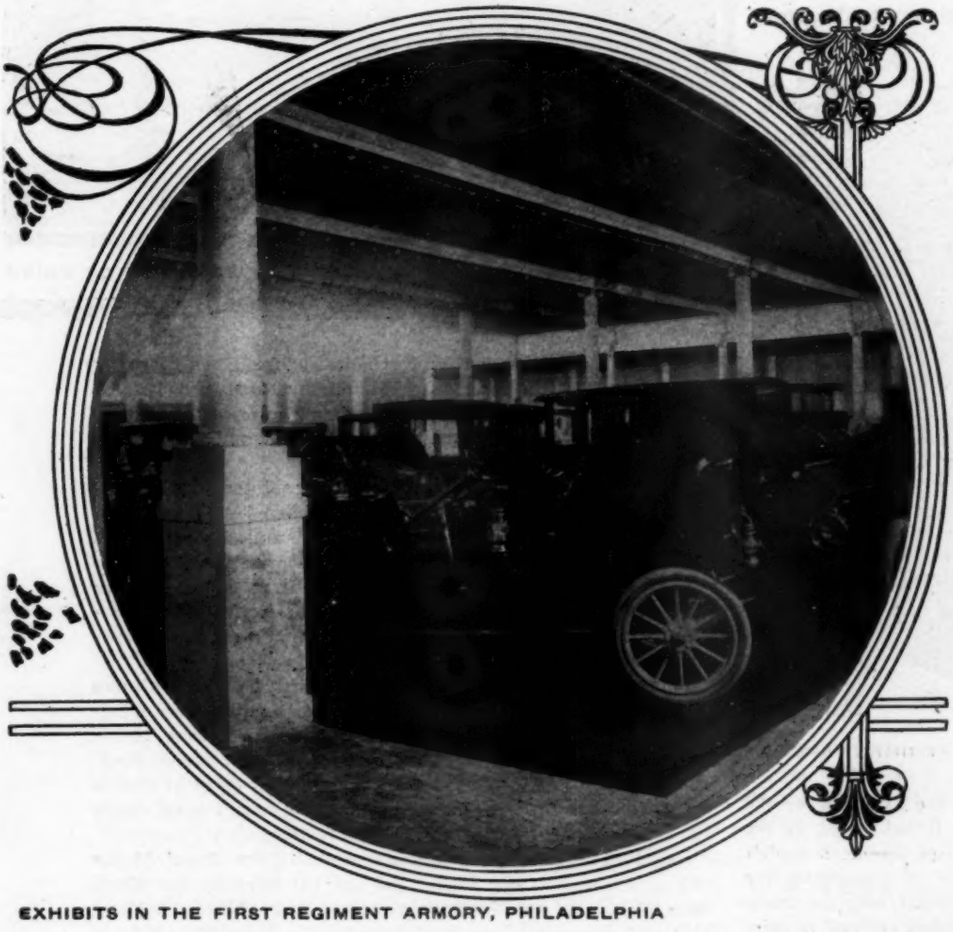
Garford—These cars are manufactured by the Garford Auto Company, Elyria, O., and exhibited at the First's Armory by the Philadelphia E-M-F Company, Broad and Callowhill streets. This line consists of six models, ranging in price from $2,250 to $4,700; three models are fitted with friction drive and the other three have selective transmission. The ignition in all cases is by low-tension magnetic plugs.

Haynes—These cars are manufactured by the Haynes Automobile Company, Kokomo, Ind., and exhibited at the First Regiment Armory by the Johnson Motor Car Company, of 326 North Broad street. This line consists of four models, ranging

in price from $2,000 to $3,000; the cylinders are cast in pairs and the pump for the water circulation is of the gear type. A contracting band clutch is fitted and the selective type transmission gives three forward speeds located in the same castings with the motor.

Hudson—These cars are manufactured by the Hudson Motor Car Company, Detroit, Mich., and exhibited by the Philadelphia E-M-F Company at the First's Armory. This line consists of two types of chassis, the "25" and the "33," the former fitted with runabout selling at $1,000, and the latter with three different bodies from $1,250 to $1,350. The selective transmission and the motor form one unit and a valve cover is fitted enclosing the valve springs. These cars are fitted with a ten-plate disc clutch.

Hupmobile—These cars are manufactured by the Hupp Motor Car Company, Detroit, Mich., and exhibited at the First's Armory by the Tioga Automobile Company, of 332 North Broad street. This line consists of four models ranging in price from $750 to $1,100. The same power plant is fitted to all models and is of the unit type, the touring model having a longer wheelbase than the others.



EXHIBITS IN THE FIRST REGIMENT ARMORY, PHILADELPHIA

Knox—These cars are manufactured by the Knox Automobile Company, Springfield, Mass., and are exhibited by North Philadelphia Auto Station, of 5425 North Broad street, at the First's Armory. This line consists of seventeen models, ranging in price from $3,200 to $6,250. Two styles of motors are built, viz., the four and six-cylinder types, both having the same bore and stroke. The fours are cast singly and the sixes in pairs.

Locomobile—These cars are manufactured by the Locomobile Company of America, Bridgeport, Conn., and are exhibited by the Locomobile Company, 245 North Broad street, at the Third's Armory. This line comprises four models, ranging in price from $3,500 to $4,800, including both four and six-cylinder types. The cylinders are cast in pairs and are the same size on both models. The four-cylinder model is fitted with a cone clutch, while the sixes have multiple disc type.

Lozier—These cars are manufactured by the Lozier Motor Company, Detroit, Mich., and are exhibited by the General Motor Car Company, 227 North Broad street, at the Third's Armory. This line comprises eight models ranging in price from $4,600 to $7,000. The motors are of the four and six-cylinder types with cylinders cast in pairs. High-tension magneto is the form of ignition and the power is transmitted to the live axle through a disc clutch and four-speed selective type transmission.

Marmon—This car is manufactured by the Nordyke-Marmon Company, Indianapolis, Ind., and exhibited at the Third Regiment Armory by the Automobile Company of Philadelphia, of 1523 Sansom street. This line is manufactured in one type of chassis with three styles of body work, all selling at $2,750. The cylinders are cast in pairs with a bore of 4 1-2 inches and 5-inch stroke, the lubrication is force feed, and the transmission, which is of the selective type, is located on the rear axle.

Marion—This car is manufactured by the Willys-Overland Company, Toledo, O., and exhibited by the Overland Marion Motor Company, 134 North Broad street. This line comprises three models and the prices range from $1,000 to $1,700. On the "30" model the cylinders are cast separately and on the "40" in pairs. Transmission in both cases is of the selective type and final drive by live axle.

Maxwell—These cars are manufactured by the Maxwell Briscoe Motor Company, Tarrytown, N. Y., and are exhibited by United Motor Philadelphia Company, of 207 North Broad street. This line comprises five models ranging in price from $600 to $1,600, from the "30" touring car to the two-cylinder runabout, with planetary transmission. The other models are fitted with progressive type transmission and with the motors and gears in one unit at the First's Armory.

Mercer—These cars are manufactured by the Mercer Motor Company, Trenton, N. J., and are exhibited by C. A. Haines Company, 2214 Spring Garden street.

Mitchell—These cars are manufactured by the Mitchell-Lewis Motor Company, Racine, Wis., and are exhibited by the Mitchell-Lewis Motor Company, Broad and Buttonwood streets, at the First's Armory. This line comprises four models ranging in price from $1,200 to $2,250. In all cases the cylinders are cast in pairs, with centrifugal pump, unit type of selective three-speed transmission and final drive by live axle.

National—These cars are manufactured by the National Motor Vehicle Company, Indianapolis, Ind., and are exhibited by the Tioga Automobile Company, of 332 North Broad street. This line is comprised of five models all 40 horsepower, four cylinders, ranging in price from $2,500 to $2,600. These cars are shaft-driven, the power being transmitted through cone clutch and three-speed selective transmission.

Oakland—These cars are manufactured by the Oakland Motor Car Company, Pontiac, Mich., and are exhibited by the Olds-Oakland Company, 506 North Broad street, at the First's

Armory. This line comprises five models ranging in price from $1,000 to $1,600. The power is transmitted through a multiple-disc clutch, four-speed transmission.

Oldsmobile—These cars are manufactured by the Olds Motor Works, Lansing, Mich., and are exhibited by the branch of 231 North Broad street at the Third Regiment Armory. The line comprises thirteen models ranging in price from $3,000 to $7,000. The types are known as "Special," "Autocrat," "Limited," the two first being of the four-cylinder type and the latter six cylinder. Four-speed transmission is used and the final drive is by shaft.

Overland—These cars are manufactured by the Willys-Overland Company, Toledo, O., and are exhibited by the Overland Marion Motor Company, of 134 North Broad street, at the First Regiment Armory. The line comprises twelve models ranging in price from $750 to $1,675. Features of these cars are separate cast cylinders, transmission located on the rear axle and thermo-syphon cooling.

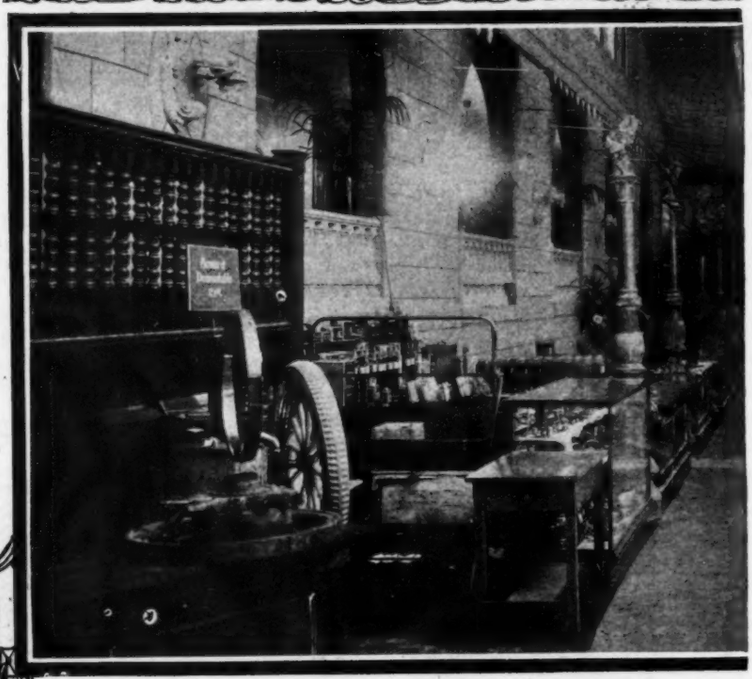
Packard—These cars are manufactured by the Packard Motor Car Company, Detroit, Mich., and are exhibited by the Packard Motor Car Company, 216 North Broad street, at the Third Regiment Armory. This line comprises seventeen models ranging in price from $3,200 to $5,700. The two chassis are the "18" and "30" and in all respects they are similar, with the transmission located on the rear axle. The cylinders are cast in pairs and a pump is used for circulating the oil.

PORTION OF ACCESSORIES ROW, THIRD REGIMENT ARMORY

Palmer Singer—Manufactured by the Palmer & Singer Manufacturing Company, 1620 Broadway, N. Y., and exhibited by the Palmer & Singer Distributing Company, 336 North Broad street, at the First's Armory. This line comprises five models ranging in price from $3,300 to $4,200. There are two models of four and two of six cylinders. Forced feed lubrication and multiple-disc clutch are features of construction.

Pierce Arrow—These cars are manufactured by the Pierce Arrow Motor Car Company, Buffalo, N. Y., and are exhibited by Foss Hughes Motor Car Company, northeast corner Broad and Race streets. This line comprises three models ranging from $4,000 to $6,000. Only six-cylinder cars are manufactured and are similar in construction. A tire pump driven by the motor is a feature of the 1911 models.

Pope Hartford—Manufactured by the Pope Manufacturing Company, Hartford, Conn., and exhibited at the Third's Armory by the Pope Hartford Sales Corporation, 612 North Broad street. This line comprises thirteen models ranging in price from $3,000 to $5,150. Two types of chassis are manufactured, a four and a six cylinder.



LOOKING ALONG THE WEST SIDE OF THIRD

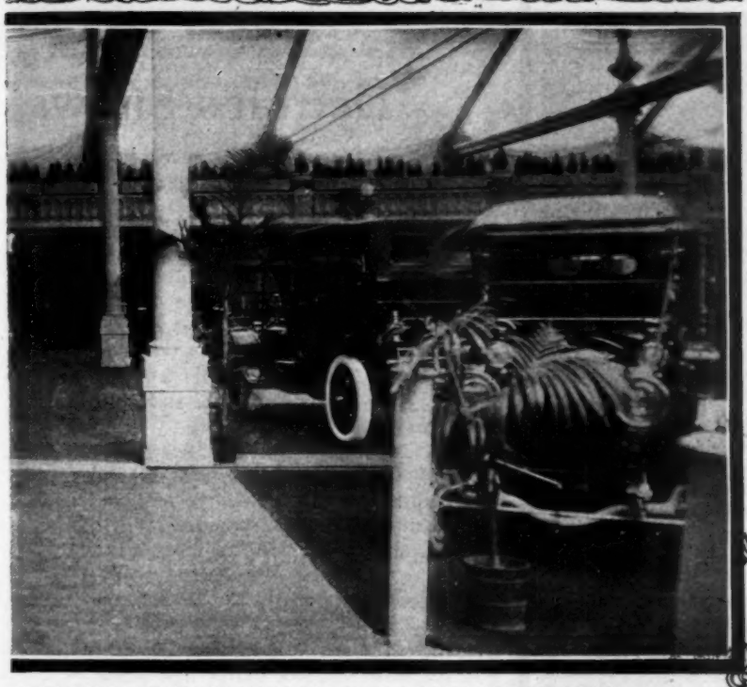
Premier—Manufactured by the Premier Motor Manufacturing Company, Indianapolis, Ind., and exhibited at the Third's Armory by The Motor Company, Sixteenth and Walnut streets. This line comprises nine models ranging in price from $3,000 to $5,000. Two types of chassis are made, the four "40" and the six "60," similar in design. The three-speed selective type transmission is located on the motor housing and on some models low-tension ignition is utilized.

Pullman—These cars are manufactured by the Pullman Motor Car Company, York, Pa., and are exhibited by Longstreth Motor Car Company, of 257 North Broad street, at the Third Regiment Armory. This line comprises eight models ranging in price from $1,650 to $3,500. The different types of chassis are O.11. M.11 and K.11, all four cylinders with cone clutch and selective type transmission and shaft drive.

Regal—These cars are manufactured by the Regal Motor Car Company, Detroit, Mich., and are exhibited by the Regal Sales Agency, of 330 North Broad street, at the Third's Armory. This line comprises three models ranging in price from $900 to $1,750, known as the N. Y. and S types. The power is transmitted from the four-cylinder motor with thermo syphon cooling through a cone clutch to a selective type transmission located on the rear live axle.

Reo—These cars are manufactured by the Reo Motor Car Company, Lansing. Mich., and are exhibited by Prescott Adamson, of 502 North Broad street, at the First's Armory. This line comprises three models ranging in price from $850 to $1,250 and the types are known as the R., S. and K., the two former having four and the latter two cylinders.

Royal Tourist—These cars are manufactured by the Royal Tourist Car Company, Cleveland, O., and are exhibited by Hills Motor Car Company, 604 North Broad street. Only the M3 type is marketed and it sells with optional body work for $4,500.



REGIMENT ARMORY, SHOWING THE HANDSOME SETTING

Stearns—These cars are manufactured by the F. B. Stearns Company, Cleveland, O., and are exhibited by G. Hilton Gantert Company, of 510 North Broad street. at the First's armory. This line comprises twelve models ranging in price from $3,200 to $5,850. Two types of chassis are made. the 15-30 and the 30-60, both four-cylinder. The smaller has the cylinders cast en bloc, with the transmission on the rear live axle and the larger with cylinders in pairs and unit type selective four-speed transmission.

Selden—These cars are manufactured by the Selden Motor Vehicle Company, Rochester, N. Y., and are being shown by G. Hilton Gantert Company, of 510 North Broad street. This line comprises five models ranging in price from $2,250 to $2,600. The transmission is carried on a subframe and the drive is by live axle.

Stevens-Duryea—Manufactured by Stevens-Duryea Company, Chicopee Falls, Mass., and exhibited by A. G. Spalding & Brothers, 202 North Broad street, at the First Regiment Armory. This line includes thirteen models ranging in price from $2,850 to $5,150. Models "AA" and "Y" are six-cylinder and four-cylinder chassis similar in design, the transmission, which is of the selective type, forms one unit with the motor and the drive is by live axle.

White—These cars are manufactured by the White Company. Cleveland, O., and are exhibited by the White Company, of 629 North Broad street, at the Third's armory. This line comprises seven models ranging in price from $2,000 to $3,800. All the chassis are alike with the exception of wheelbase. The four-cylinder motor is cast en bloc with centrifugal pump cooling. Four-speed selective type transmission transmits the power to a live axle.

Winton—These cars are manufactured by the Winton Motor Carriage Company, Cleveland, O., and are exhibited by their branch, 244 Broad street, at the Third Regiment Armory. This line comprises five models ranging in price from $2,750 to $4,500 and are all six-cylinder, the chassis in each case being identical. The cylinders are cast in pairs and have a self-starting attachment fitted by which compressed air is injected into the motor.

Stanley—These steamers are manufactured by and are exhibited by Walter Harper at the First Regiment Armory.

Babcock Electrics are exhibited by A. G. Spalding & Bros. and the **Bailey Electric** by the Stoddard Dayton Auto Company, of 253 North Broad street.

A fact clearly demonstrated by the exhibition now in progress is the need of a convention hall or other building sufficiently large to accommodate displays of this character. The show has outgrown all available quarters. While the securing of two buildings by the committee in charge was a happy solution of an otherwise vexing problem, the housing of the exhibition under a single roof would seem to be a condition most to be desired.

Practically every exhibit was in place to-night, only the finishing touches remaining to be placed. By Monday the show will have settled into its stride and all roads will lead to what promises to be the banner exhibition of them all. Interest promises to remain unabated for the next two weeks at least, as those companies not represented at the show are holding private shows of their own, and there is a goodly number of these.

ACCESSORIES IN THIRD REGT. FROM ANOTHER ANGLE

Velie Auxiliary to Make Motors

MOLINE, ILL., Jan. 9—The Velie Engineering Company, of this city, has been incorporated with a capital stock of $200,000. The incorporators are Willard L. Velie, Lawson M. Fuller and Otis E. Mansur, all of Moline. The object of the corporation is to manufacture automobile engines, automobiles and accessories.

The Velie Engineering Co. is an independent corporation, though its stock is held by owners of the other Velie concerns —Velie Motor Vehicle Co. and Velie Carriage Co.

A $160,000 plant for the engineering company has just been completed in the east end of the city and is being prepared for operation, manufacturing to begin within two weeks. Engines for Velie automobiles will be the sole output for a time but the intention of W. L. Velie, the controlling member of the corporation, is to enlarge the plant in time with a view to manufacturing, not engines only, but all parts for the Velie automobiles that are at present manufactured by accessory concerns in the East and Middle West.

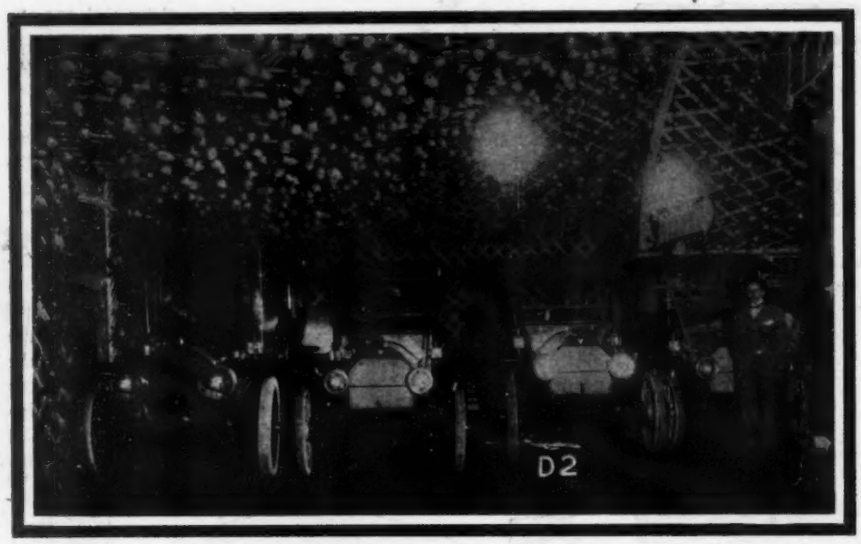


Fig. 1—Hudson and Peerless exhibit

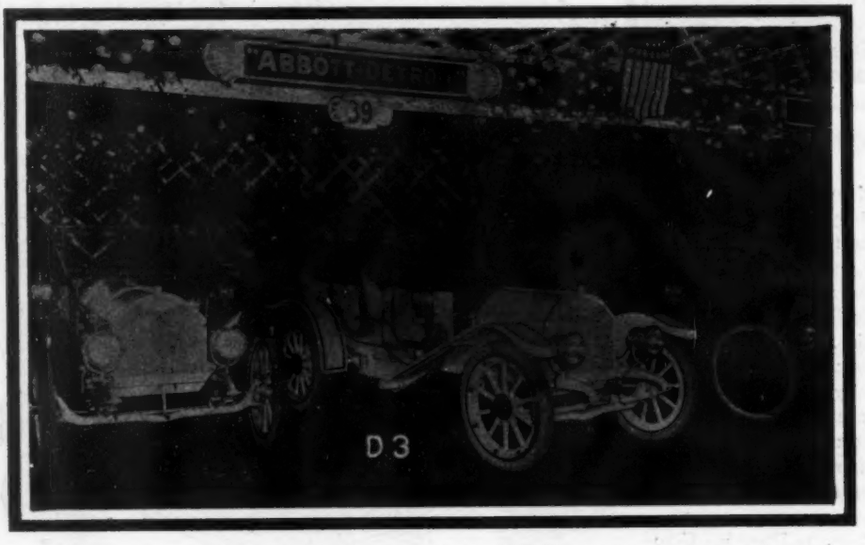


Fig. 2—Abbott-Detroit exhibit, showing touring car, demi-tonneau and runabout

Fig. 3—Haynes, Standard and Packard exhibits, with Packard car in foreground

Detroit's Shows

DETROIT, MICH., Jan. 16—With an air of confidence as to the outcome, the local automobile show season opened to-night with a double exhibition. The effervescent enthusiasm of other years was present in a modified form, but did not seem to occupy such a prominent place as simple, assured confidence.

The Detroit Automobile Dealers' Association is staging its show in Wayne Gardens, where thirty-six dealers are exhibiting cars. Not an accessory is on show and the most rigid sort of a drawing was required in order to provide space for those who are taking part.

The other show, which is being held in the north corridor of the new Regal factory, has fifty-four exhibits, including a number of accessories and an aeroplane. Admission is charged at the Gardens, but those who wish may inspect the other display without cost.

It was not until January 5 that the United Automobile Dealers' and Manufacturers' Association came into existence. One week later plans had been perfected for an "overflow" show; and it is indicative of the progressiveness of those back of the undertaking that this show opened promptly on time Monday evening.

Fortunately the Regal Motor Car Co., itself among those unable to get in the Wayne Hotel Gardens, came to the rescue of the new body, which was in a quandary regarding a place in which to hold its exhibit. The Regal Company happened to have a new building containing approximately 60,000 square feet of floor space that was awaiting the arrival of machinery. This was immediately turned over to the United Association and answered the purpose admirably.

In the Garden show there are thirty-six exhibitors, showing something like 200 models, which range all the way from a little runabout and an electric pleasure vehicle up to a seven-passenger touring car and a massive truck. The Garden show is confined exclusively to finished cars, it having been found necessary to exclude parts and accessory makers through lack of space, while even the accustomed line of motorcycles is tabooed in order to make room for more machines. This was the cause of a mild protest at the time, but there was no alternative, and in the end all unable to get into the Gardens were taken care of at the "overflow."

WAYNE GARDENS AS ROSE BOWER, WHILE OVERFLOW SHOW OPENS IN REGAL FACTORY

In the way of new offerings locally there might be mentioned a Stevens-Duryea that proved a strong attraction; a new Hudson "33"; the Hupp-Yeats Electric coupé, which proved one of the real novelties of the show with its underslung frame and low-set body; an underslung K-R-I-T that attracted attention; Phipps-Grinnell electric coupé and light delivery wagon; the new Sampson "35," which furnished much food for consideration on the part of the trade; the Evans Limited, a two-cycle delivery car of unusual design; a Stoddard-Dayton that could be converted from a pleasure into a utility car, and others, while all the makers came through with a full line of their product in the familiar types.

To Manager Walter H. Wilmot is due a large measure of credit for the success of the present show. Backing him in every move was the Detroit Automobile Dealers' Association and its very efficient officers. These include George E. Lane, president; George D. Grant, vice-president; Robert K. Davis, secretary, and John H. Brady, treasurer, all of whom gave liberally of their time and money in promoting the undertaking.

At present twenty-four representative concerns are embraced in the D. A. D. A.; these, together with the cars handled, being the Brush Detroit Motor Car Co., Brush, Sampson; Buick Motor Co., Buick, Welch-Detroit; J. H. Brady Auto Co., Hudson; Carter Car Co., Cartercar; Craig Motor Car Co., Abbott-Detroit; Cunningham Auto Co., E-M-F, Studebaker-Garford, Flanders; Cadillac Motor Car Co., Cadillac; Ford Motor Co., Ford; Gillespie Auto Sales Co., Thomas Flyer, Reo; Neumann-Lane Co., Pierce-Arrow, Stoddard-Dayton, Rauch-Lang Electric; Olds Motor Works, Oldsmobile; Rapid Motor Vehicle Co., Rapid Trucks; John P. Schneider, Locomobile, Stevens-Duryea, Alco; Grant Bros. Auto Co., Chalmers, Amplex; Security Auto Co., Everitt; Siedler Miner Auto Co., Jackson; Standard Auto Co., Packard; United Motor Detroit Co., Maxwell, Columbia; Winton Motor Carriage Co., Winton; C. F. Gilmour, Mitchell; Warren Motor Car Co., Warren-Detroit; Elmore Automobile Co., Elmore; Lozier Motor Car Co., Lozier.

The other exhibitors at the Garden are as follows: Overland Motor Sales Co., Overland; Nederlander Auto Sales

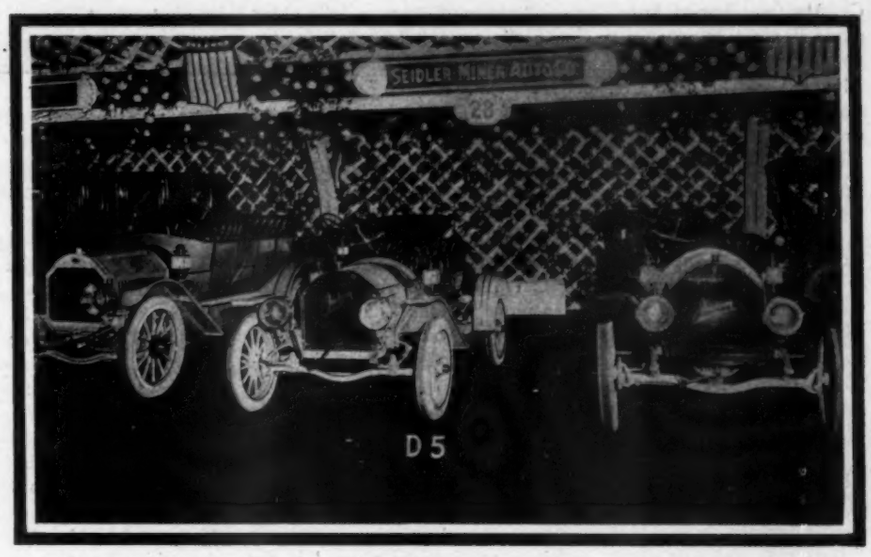


Fig. 4—Seidler Miner Auto Co.'s exhibit, showing Jackson cars, including torpedo

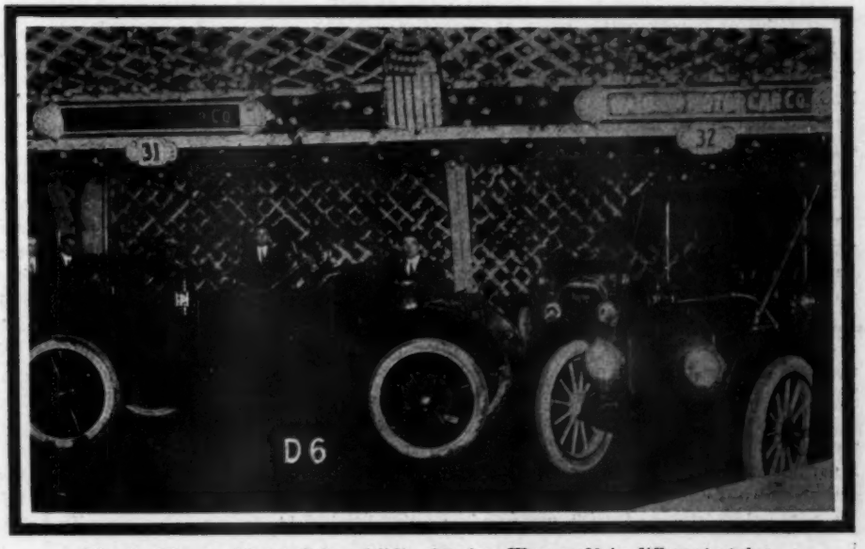


Fig. 5—Warren Motor Co's exhibit, showing Warren 30 in different styles

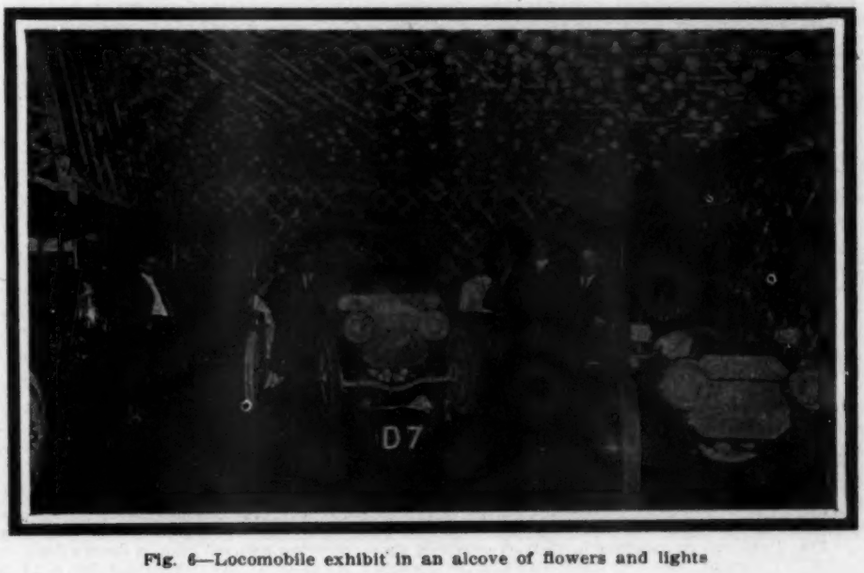


Fig. 6—Locomobile exhibit in an alcove of flowers and lights

Co., Haynes; Annett Auto Garage, Auburn; Collins and Co., Marmon; Federal Motor Truck Co., Federal; Krit Motor Sales Co., Krit; Charles Berdan, Cutting; Alpena Motor Car Co., Alpena Flyer; Vandyke Car Co., delivery car; R. H. Evans, Evans Commercial; Imperial Auto Co., Imperial; Anderson Carriage Co., Detroit Electric; Hupmobile Motor Co., Hupmobile; Lion Motor Sales Co., Lion; Seitz Motor Car Co., trucks; Detroit Electric Truck Co., trucks; U. S. Motor Co., Grabowsky trucks; Alden Sampson Co., trucks.

Although organized hastily, the exhibit given by the United Automobile Dealers' and Manufacturers' Association was in every way a highly creditable effort. The problems confronting those back of the move were far more serious than those with which the D. A. D. A. has to wrestle. First of all, the Regal plant was not particularly accessible, being located some three miles from the Wayne Hotel Gardens. Then, too, converting a factory into a show place is not the easiest task imaginable. There was a space 60 feet wide and approximately 1,000 feet long available. Decorators busied themselves, with the result that when opening time came the long corridor-like room was a mass of bunting and flags that bore no semblance to a prosaic automobile factory.

Here was space in plenty, although applications poured in the moment the "overflow" show was announced, and dealers and makers who participated in the United show at least had the satisfaction of having ample room at their disposal.

Something like fifty concerns, including accessory and parts makers, were included in the list of exhibitors. Many of the leading makes of cars were on display, with a full line of models, and the showing of accessories and parts was particularly interesting to Detroiters, who through lack of adequate space had been deprived of such an exhibit for some years.

To four men belongs the bulk of the credit for the United Automobile Dealers' and Manufacturers' show. These comprised the show committee, of which C. B. Fear, local agent for Paterson cars, was the energetic chairman; George Franklin, of the Regal Motor Car Co., and A. L. Beckendorf, of the Oakland Motor Sales Co., together with C. W. Dreyer, of the Superior Motor Car Co., treasurer of the United Association. Co-operating with them were a score of dealers and manufacturers, headed by the Regal Co., which furnished the space and did everything in its power to assist the enterprise. Whether the United Automobile Dealers' and Manufacturers' Association will develop into a permanent body, or whether the two organizations will get together and unite their powers in behalf of a building adapted to an automobile show of such magnitude as the local field demands, can only be conjectured at this time. At all events, the United members are jubilant over the success they achieved.

The list of exhibitors includes the following: Montgomery Motor Sales Co., American Traveler; C. B. Fear Auto Co., Paterson; Small Motor Car Co., Cavac; Day Auto Co., Day Utility Car; Columbia Buggy Co., two cars; Cole Motor Sales Co., Cole "30"; Herreshoff Motor Co., Herreshoff; International Harvester Co., International trucks and pleasure cars; Mayhew & Mayhew, Imperial; Oakland Motor Car Co., Oakland; Overland Motor Sales Co., Overland; W. J. Marshall, Carhartt and Paige-Detroit; Woods Electric Garage, Woods; Regal Motor Car Co., Regal; Flint Wagon Works, Whiting; W. G. Wagenhals, delivery wagons, three-wheelers; Superior Motor Car Co., Delivery Wagons; R. Fuller, "Quadru" heavy duty truck; Ideal Motor Truck Co. of Detroit, Ideal; Dusseau Fore and Rear Drive Auto Co., Dusseau; Grand River Auto Co., Gramm trucks; Strobel's aeroplane; Knop Battery Co., J. T. Wing & Co., mill supplies; Detroit Wire Spring Co., cushion springs; King Shock Absorber Co., shock absorbers; Weston Mott Co., axles; N. Lazarnick, automobile photography; Collins Green Mfg. Co., parts; Auto Crank Shaft Co., crankshafts; Muzzy Lion Co., auto parts; Corcoran Detroit Lamp Co., lamps; J. N. Smith & Co., windshields; Detroit Steering Wheel and Windshield Co., American Top Co., Oldberg Mfg. Co., general accessories; Michigan Magneto Co.; McCord Mfg. Co., radiators; Crown Oil Co., Ireland and Matthews, lamps; Detroit Auto Specialties Co., fenders, guards, etc.; Sewell Cushion Wheel Co., wheels; Pennsylvania Milled Screw Co., machined screws and parts, etc., and Emil Grossman, spark plugs, windshields, etc.

The features of both shows as far as novelties are concerned are not numerous. In the Gardens a new truck, the product of the Federal Motor Truck Co., of Detroit, is on exhibition. This car is shown in three standard body styles, an open express, stake truck and panel delivery wagon. One size of chassis is used. The motor is four-cylinder, four-cycle type 4 1-4 by 4 1-2 inches. It is water-cooled. The clutch is leather-faced, transmission selective with three speeds and reverse, in unit with bevel gears and differential case on the jackshaft is employed. The drive is by two chains to the rear wheels. The frame is deep, wide pressed steel of channel section. The springs are semi-elliptic. The front axle is of I-beam form; worm and worm wheel drive. Two sets of internal expanding brakes are used. The wheelbase is 110 inches and the car is equipped with solid tires, 36 by 3 inches.

At the United show in the Regal factory three new styles are shown in the line of commercial cars. The "Quadru," an immense car with a load capacity of 15 tons, attracts much attention. This car has a gasoline engine of 32 horsepower which generates electric power. The car is driven entirely by electricity and the drive is applied to all four wheels. A big crane, jack and other devices are carried on the truck for handling heavy freight. A trailer is attached to the truck, making the total length about 47 feet. In practical test work on a long haul, the truck hauled a load of freight from a railroad point to a factory in Detroit vastly quicker than the railroads could have done it.

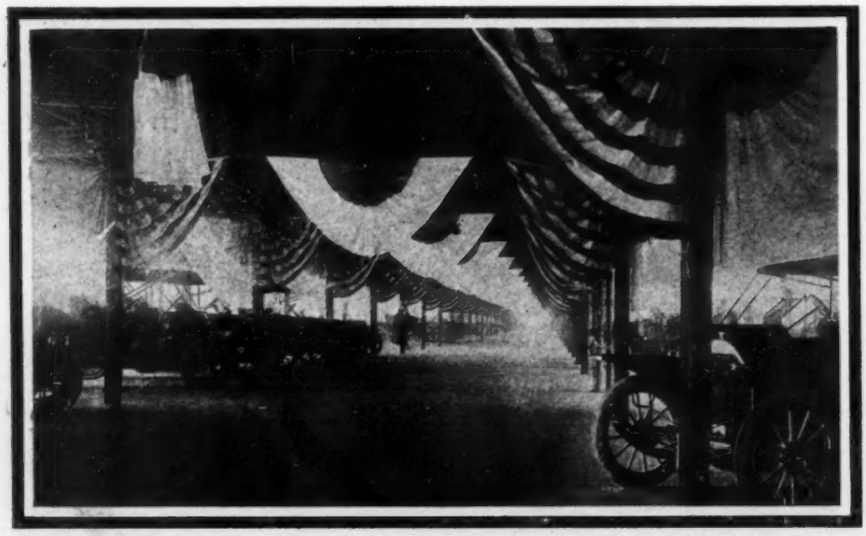


Fig. 7—Group of exhibits in Detroit overflow show, showing general plan of decoration

Another new car is the Cavac, a three-wheel delivery car of light weight and low center of gravity.

Still another is an experimental car of the Dusseau Fore and Rear Drive Auto Company at Toledo. This car uses a gasoline engine and applies the power without converting it into electric current.

The new Regal "20" underslung in chassis, racing car and various pleasure body types is shown for the first time.

Business Cars at Garden

VISITORS AT TRUCK SHOW LIKENED TO HUNGRY MEN SEEKING COMMERCIAL SUCCESS IN THE GREAT GATHERING OF TRADE AUTOMOBILES AND ACCESSORIES

BUSINESS men are thronging the Garden this week where the A. L. A. M. trucks, delivery wagons and business automobiles of all sorts are on display. While the aisles and galleries are not so crowded as they were last week when the splendid lines of pleasure cars were shown, the attendance at the Garden is significant.

Naturally, a large part of the crowd is composed of representatives of manufacturing and trading concerns who have been invited to inspect the trucks and other cars, but the most astonishing thing about the attendance is the fact that such a large proportion of the visitors seem to be on business bent.

The show management, under the direction of Secretary Downs, has issued many thousands of invitations to selected companies, all of them potential purchasers and users of commercial vehicles in various parts of the country, and the response so far has been flattering in the extreme.

The typical visitor to the show this week is the well-dressed, active American merchant. His investigation is not idle nor superficial. It goes directly to the root of the transportation problem. In approaching any of the exhibits his question is not "How much is this one listed at?" It is usually some inquiry as to mechanical construction or economy of operation, or reliability of the car. All of which indicates that the necessity of truck equipment in any line of business where horse-drawn vehicles have been used, and in many lines where such equipment has proved inadequate, is appealing to the business men.

Tuesday night the representative of a big commercial house made the rounds of the Garden. He was in a hurry, and only inspected three or four types of heavy trucks, but he had prepared himself in advance so that his house might obtain a full line of information with regard to the exhibited cars. He carried a bundle of postal cards addressed to himself, upon the backs of which he had tabulated a dozen questions touching the heart of transportation. His plan was to examine as many of the machines as he could personally and to distribute the postal cards to the representatives of all the appropriate lines with the request to fill out the blanks and mail them to him.

In this way he had a chance to look over some of the cars and to obtain information as to all the others in which he was interested.

This plan is only one of many that are being put in practice this week. Another favorite, particularly among those who have more time than in the case of the one outlined, is for the investigator to studiously inspect the various models and take voluminous notes on the feature points. Exhibitors state that some of these investigators spend as much as two hours examining a single model, and that their notebooks are filled with

GENERAL VIEW OF THE A. L. A. M. COMMERCIAL VEHICLE SHOW FROM EAST END OF GARDEN

interesting details when the investigation is concluded. The method employed is based upon a general classification prior to starting the inspection. The inquirer makes up a list of six or seven makes of trucks and then spends an hour or more looking up the mechanical features of each of the cars, its record for cheap operation and maintenance.

The whole procedure is marked by an astonishing knowledge of the various cars. In fact, the exhibitors are often puzzled to know how these prospective purchasers come to know such an immense amount about their cars.

Looking across the Garden from the northwest gallery

Any estimate of the amount of business transacted at the show would be vain. Nearly every company has reported much business, and several sales have been made in nearly every case, but the vast bulk of the business will not be done at the show. It is going to come along later, and not so much later at that, according to the surface indications.

Another class of investigators and purchasers are municipal officers representing several departments of city governments. One exhibit, in which a 60-horsepower fire engine is the feature display, has entertained the chiefs of fire departments of six nearby cities up to Tuesday night. The chiefs know all about automobile fire engines, and the cross-examination they gave the manager of the exhibit was wonderfully complete and convincing. This particular engine embraces several novel features, and it was illuminating to watch the faces of the fire fighters as they grasped the purpose and utility of each new phase of the machine.

Police chiefs were also strongly in evidence, and the several models of patrol wagons and automobiles useful for the service of the departments in other ways were given a most careful inspection.

The line of ambulances was not neglected, and in one of the exhibits Tuesday night a committee of young surgeons from one of the New York municipal hospitals tested out the accommodations from a practical viewpoint. They demonstrated just how they would have to cling to a leather strap in order to be steady in the application of restoratives to patients in emergency cases and showed the details of the drill that will be installed as part of their routine. The particular type of ambulance referred to has a number of improvements and advancements over those now in use, and these changes were commented upon from the professional viewpoint of the surgeons.

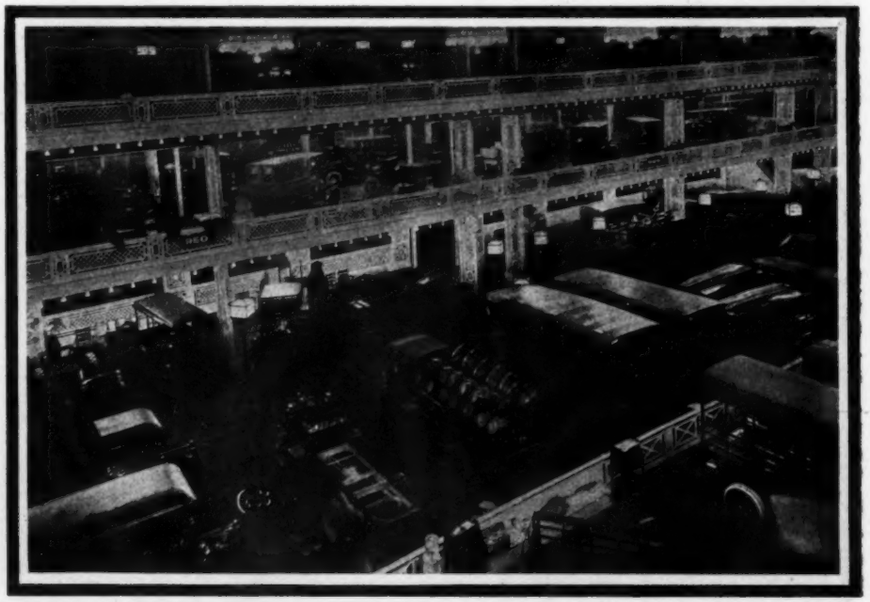
Every exhibit had its share of patronage, and those in charge were certainly much busier in describing their wares than were the salesmen during the record-breaking show last week.

Despite the fact that there are few women, comparatively, in the crowds at the Garden this week, the electric pleasure cars that are being shown are not neglected. The bulk of the inquiry for this type of automobile seems to be coming from men who reside in large cities.

There are few curiosity seekers at the show, and that strange type of humanity that makes a point of collecting catalogs with no idea of doing business is refreshingly absent. Every visitor seems to be there for a serious purpose. Mere beauty is subordinated to utility in the attitude of the visitors. They seem to care more for mechanical details; for strength, stability, reliability; for power and economy, rather than for the grace, delicacy and artistic exterior appearance characteristic of the pleasure car.

Business is the keynote, and it is carried out in every ramification of the show. It is very apparent that those who are busy looking over the cars this week are doing so with something more than enthusiasm for the automobile. Their activity, in a measure, may be compared with that of hungry men. It is not so much choice on their part in seeking this phase of the automobile as it is necessity. The trend of business has turned strongly toward the commercial car, and the men who are busiest this week are those who have realized that the greatest measure of success is only possible through improved conditions of transportation.

Recently the lines have been drawing closer, and the mark that separates business success from failure may well be described on the same basis. Where the division may be shadowy



The south gallery, with big trucks in the foreground

as between great and moderate success, it is clear and sharp as between success and failure. That this is the view of the commercial world is proven over and over again at the Garden show.

Like the cars shown, the accessories on display this week are heavier than those exhibited during the reign of the pleasure cars at the Garden. The tire displays are substantial, and the same general principles apply to them as to the cars. Every inquirer is a potential purchaser, and there is nothing frivolous about his mission. Ignition displays come under the same classification, as do also the exhibits of parts, tools, forgings, motors and, in fact, the whole list of general accessory exhibits.

According to exhibitors of all classes, there never was quite such a serious automobile show as that now being staged at the Garden.

Outside of the building demonstrating cars are stored close at hand, and when the visitor is sufficiently impressed with a certain car or type of car he is given a practical demonstration under approximate service conditions. Economy and the cost of maintenance, figured down to hundredths of a cent per ton mile, are prominent features of this phase of the show. Little is taken for granted, and while reputation is always a valuable asset, the buyers insist on being shown as to actual performance.

As a factor in the education of makers, sellers and the public, the present show is a power.

Case Salesmen Meet

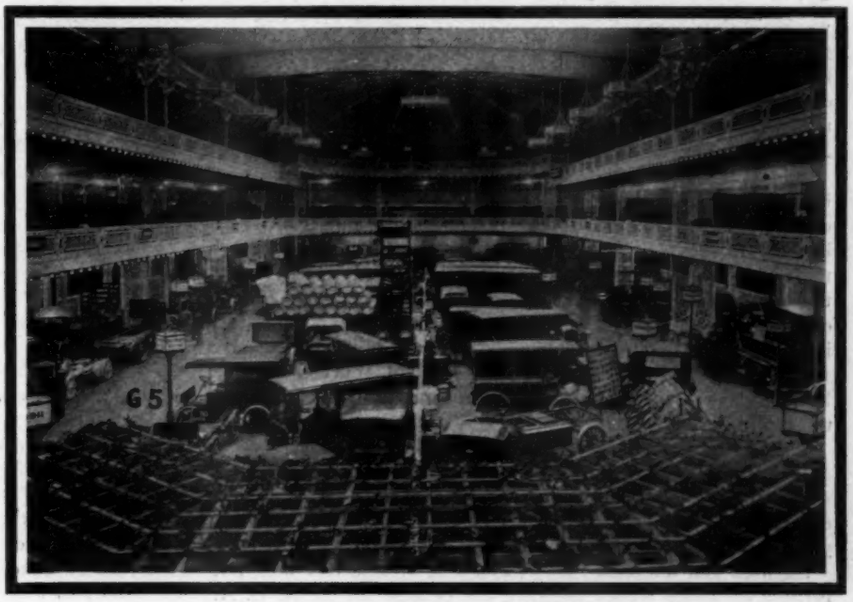
RACINE, Jan. 16—One year ago the J. I. Case Threshing Machine Company offered a free trip to the factory to two salesmen in each territory. The trip was a reward for the salesman selling the most goods for the year, and the salesman showing the largest increase over the year 1909 in the territory he worked for that year. No one salesman was allowed to have both records. As a result, about seventy (70) salesmen are now in Racine, looking over the plant and getting a line on the output for the year, also receiving instructions that will help in their sales work.

Looking east from gallery over the main entrance

Caley Heads Good Roads Fight

COLUMBUS, O., Jan. 16—Fred H. Caley, former Registrar of Automobiles in Ohio, who took up his duties as general manager of the Cincinnati Automobile Club yesterday, will be the leader in the fight before the Ohio General Assembly to secure the passage of better road laws in the Buckeye State.

One branch of the good roads fight to be taken up is opposition to the large appropriations for the mantenance of the canal system of the State. Autoists will try to show the Legislature the inutility of spending money on the obsolete canal system.



View of the Garden from the southwest gallery

Quakers Will Entertain Celebrities.

PHILADELPHIA, Jan. 16—The third annual dinner of the Quaker City Motor Club will be held at the Hotel Walton on Tuesday, January 24, and judging by the number of men prominent in the motoring world who have already signified their intention of being present, it promises to greatly exceed the two previous dinners. Musical entertainment will be provided by Franklin L. Wood, baritone soloist, and others, and Joseph P. Rogers will act as toastmaster.

Among others, the following will respond to toasts: Charles T. Terry and S. M. Butler, who will speak on Federal Registration and the Outlook for 1911, respectively; Mayor Reyburn of Philadelphia will exploit the Fairmount Park Road race; Henry Clay, Director of Public Safety, will digress on the future attitude of his department in relation to automobiles; J. B. R. Smith, Highway Commissioner of New Jersey, will tell about the proposed new laws in his State; Webster Grim, late candidate for Governor of Pennsylvania on the Democratic ticket; Henry F. Walton, Prothonotary of Philadelphia; Mayor Franklin P. Stoy, of Atlantic City, will speak on the proposed new boulevard between the Delaware River and the seashore; Justice John P. Elkin, of Pennsylvania; William C. Sproul, State Senator from Delaware County and quite an additional list beside.

Harmony in Milwaukee

ANNUAL SHOW CONDUCTED BY DEALERS IS LARGER, FINER AND MORE INTERESTING THAN EVER BEFORE, WITH ALL HANDS REPRESENTED IN AUDITORIUM

MILWAUKEE, Wis., Jan. 16—That unity and harmony are the attributes of success in the presentation of a motor show is proved absolutely by inspection of Milwaukee's third annual exposition, which opened in the Auditorium at 8 o'clock on Saturday evening, January 14. It is the first annual show of the Milwaukee Automobile Dealers' Association, and the third to be given in Wisconsin's metropolis, the two previous shows having been under the management of the Milwaukee Automobile club.

Whatever the conditions may be elsewhere, it is certain that in Milwaukee the dealer and manufacturer can hold the successful motor show, rather than the owner, as an organization like the M. A. C. There was harmony between the club and the dealers on the occasion of the first show in March, 1909, but the only show hall available was the Hippodrome, five or six of which could be dumped into the mammoth Auditorium building and hardly be noticed. The second club show in February, 1910, comfortably filled the Auditorium, but fourteen of the leading dealers in Milwaukee became insurgents and refused to "get in."

It is these fourteen dealers who form the nucleus of the M. A. D. A., which is holding its first—and eminently successful—show this week. Under their banner have gathered all of the other dealers who stood by the club in 1910. The club this year stands as a sub-sponsor.

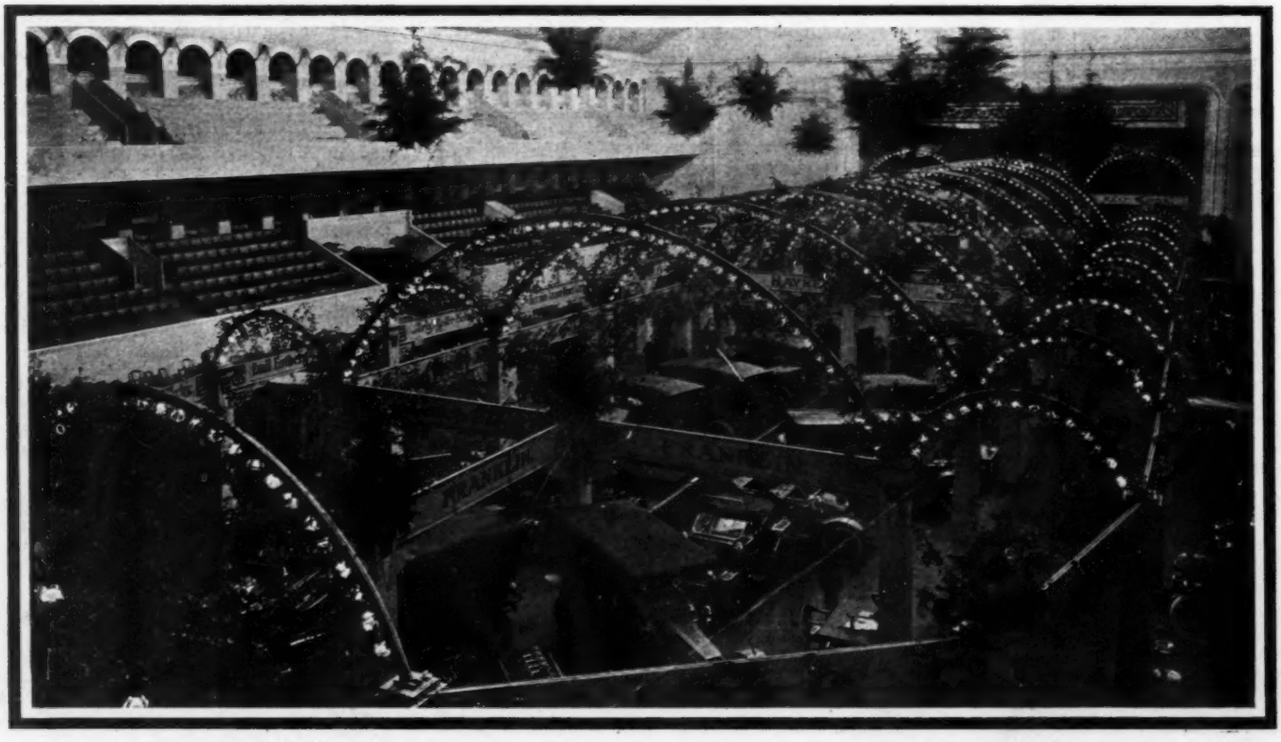
Licensed and unlicensed cars stand side by side this year, not because of Judge Noyes' decision, but because the M. A. D. A. set out to present a complete show and give representation to all. In this connection it will be recalled that the $500,000 damage suit of the Velie Motor Vehicle Company, of Moline, Ill., against twenty-five A. L. A. M. members and an agent, the Kopmeier Motor Car Company, of Milwaukee, was the direct outgrowth of conditions at the 1910 show here.

The Kopmeier company, handling the American, Chalmers and Detroit electric and also the Velie, was ordered not to display the unlicensed Velie at the 1910 Milwaukee show in connection with the licensed American and Chalmers. This order was obeyed and the contract with the Velie was abrogated. The suit followed and is still in the courts.

The Velie exhibit this year is one of the most prominent as well as one of the most beautiful at the Milwaukee show. The factory is the exhibitor.

Under an elaborate decorative scheme of the arcade type, in the immense arena, in the Juneau and Plankinton convention halls, in the corridors and aisles, sixty-two distinct makes of pleasure cars, and sixty-one groups of accessories and parts are being shown at Milwaukee this year. In the basement under the arena, sixteen commercial car manufacturers are represented, making a total of 139 exhibitors. Motorcycles, which formed an important part of the 1910 show, are entirely absent because of the lack of room.

In the decorative scheme the "national show" idea is carried out, a striking feature being the exhibitors' signs. The name of each car or the trademark of manufacturer is given in the same design or combination and type of letters as in the original, rendering recognition of the various stands quite easy. This uniformity of decoration and sign work has a number of further advantages. In the first place it does away with the bizarre effects that marred some of the earlier shows and at the same time adds to the artistic completeness of the scene.



INTERIOR OF AUDITORIUM, WHERE MILWAUKEE AUTOMOBILE DEALERS' SHOW IS BEING HELD

The list of foreign or out-of-the-State exhibitors is small, showing that the agency line of Milwaukee and Wisconsin dealers is as complete and representative as any other State, excepting perhaps Illinois and a few eastern States. The F. A. L. Motor Company, Velie Motor Vehicle Company, Henry Motor Car Sales Company, Westcott Motor Company, and Cutting Motor Sales Company are the outsiders here this year. Wisconsin distributors and factories outside of Milwaukee that are exhibiting are: J. I. Case Threshing Machine Company, Racine, the Case; LaCrosse Plow Company, LaCrosse, the Imperial; Orrin R. Hughes, Marshfield, the Garford and Garford truck.

The Cutting Company has already established a selling agency in Milwaukee as the result of exhibiting here, and the Velie, Henry, Westcott and F.A.L. will doubtless find representation before the close.

The Petrel, made in Milwaukee, is being exhibited at the factory. The Moline is shown in private exhibit at the Wisconsin State agency, Waite Bros.

Polished and cut-out chassis are being shown in much larger number than last year. Among the most beautiful of these are the Great Western, Chalmers 30, Overland, Rambler, Cadillac, Peerless, Reo, Johnson, Rider-Lewis, Lozier and others. More than 75 per cent. of the pleasure car exhibitors show stripped chassis.

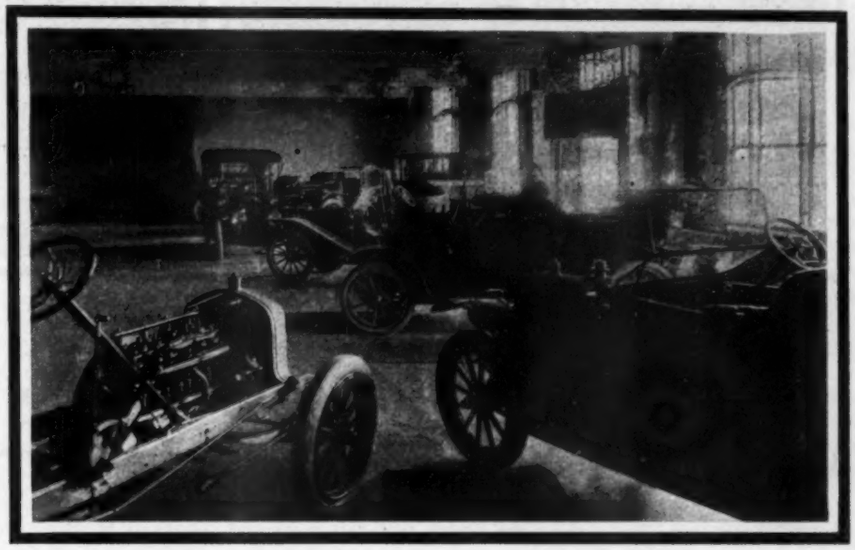
In the Marmon exhibit is Joe Dawson's "36." The Buick branch shows all of the magnificent trophies won by Buick cars for several years back. All of the important trophies contested for this and last year are being displayed.

The commercial car exhibit, always one of the largest in the country, substantiates the claim this year. About forty cars constitute the department. One of the features this year is the exhibition of "sold" cars, an excellent method of showing how the truck can be adapted to business or industry, the various practical body types, with the trademarks and names of the purchasing firms painted on the bodies. Several cars that have been in use in Milwaukee are being shown by the makers, showing conclusively how they stand up under actual service.

The Sheldon Axle Company, of Chicago, has an exhibit in the commercial section.

Previously it has been deemed inadvisable to hold the Milwaukee show before the national at Chicago, but the M. A. D. A. established a precedent. The idea had always been to follow the Chicago show closely in order to get the cream of the exhibits in the original form as displayed in a national show. It has been found this year that not alone did exhibitors procure from their factories their best goods, but a number are exhibiting here who will not be found at other shows throughout the country.

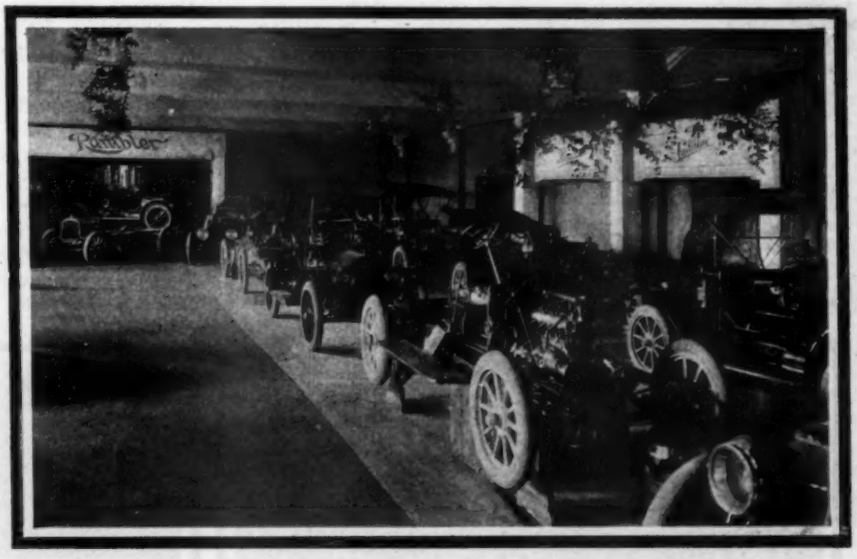
The direct management of the show is in the hands of Bart J. Ruddle, of Milwaukee, a well known show and exposition promoter. This is his first venture in the motor car line. Frank J. Edwards, Kisselkar distributor, is chairman of the show committee, consisting of Cliff E. Golder, the Corbin and Reo agent, who is president of the M. A. D. A.; H. B. Pruden, of the Packard and Rauch & Lang forces, secretary of the association; August Jonas, Peerless and Cadillac distributor; Waldemar Kopmeier, Chalmers and Detroit electric; Edgar F. Sanger, Stearns, Maxwell and Columbia, and Emil Estberg, Pope-Hartford.



The KisselKar exhibit in the Milwaukee Auditorium

The show opened Saturday night, January 14, but was closed all day Sunday, re-opening Monday at 10:30 a. m. The show will close on Friday night, January 20. In making this arrangement of dates, the M. A. D. A. has established another precedent, but one that is of especial advantage to the class of exhibitors at this show.

Among the cars that are making their initial appearance at the show are the following: The Falcar line, which made an enviable record in competition during last year; the Rider-Lewis line of gasoline pleasure cars and several trucks, including: Sternberg, Brodesser, Utility, Champion, and Abresch delivery cars. Among the features of the accessory exhibit are these: Electrobola lights; Electric Star auto headlights; Milwaukee Oil Pump and Tank Company; Dahl Punctureless Tire; Arnold Electric Alarm, and the Defender Tire Tread.



Rambler, Peerless and Cadillac exhibits in the Auditorium

Fig. 1—Looking at the garage at West Liberty, showing an Overland car hitched to a wagon-load of chickens

Fig. 2—Line-up in front of the garage of the automobiles which went on the "Booster Run"

West Liberty Has a Run of Its Own

WHILE financiers in the effete East are debating the pros and cons of the automobile and its value from an economic point of view, the progressive citizens on the Western plains are picking the plums that fall right and ready into their laps, and they, at least, learn by actual practice, that the automobile has a marvelous economic value, and that it pays for its feed every day in the week, Sunday included. V. R. Lane, a hustling photographer of West Liberty, Iowa, took the photographs as here presented, showing a run that was organized at West Liberty, and it was advertised locally as a "Booster Run." West Liberty is located on the River to River Road, and, according to Mr. Lane, Eastern tourists are common occurrences there, so that when the run was organized, taking in all the small towns within that trading district, it was not only of consuming interest to the progressive citizens thereabouts, but there was a goodly scattering of the "tenderfoot" variety, and the consensus of opinion was that West Liberty is capable of fathering a most excellent event. One of the illustrations shows an Overland car in front of a garage (a well-appointed and up-to-date garage, by the way) drawing a light wagon with chicken-coops aboard, filled to overflow with the fruit that tickles the palate of every darky in the land. West Liberty has its quota of modern automobiles, but the business men there haven't a monopoly. The farmers use them for utility purposes on week days, and take their families to church on Sunday.

St. Paul Show Draws Big Crowds

MINNEAPOLIS, MINN., Jan. 14—With a brilliant display of models awaiting the inspection of motor lovers of the Northwest, St. Paul's first annual automobile show opened in the Armory Tuesday afternoon with an attendance of 4,000 people. The exhibition was promoted by the combined business organizations of St. Paul, and was managed by a committee of the Automobile Dealers' Association. Nearly one hundred and fifty cars were on the floor, every one a 1911 model. Practically every dealer in the Twin Cities was represented.

The interior decorations of ivory and gold were effectively shown off by the addition of eight flaming-arc lights to the already brilliant illumination plan of the building, to which were added strings of incandescent lights.

One feature of the show which created much interest was centered in the work of Peter Daley in starting a motor through wireless power. In one corner of the room the wireless switch was turned on. More than 100 feet away Mr. Daley stood beside a large car, made the necessary arrangements in his apparatus there and started the car.

Another feature was the exhibition of the first automobile, "The Pioneer," ever brought to St. Paul, which created no end of interest. It was exhibited by J. George Smith and "manned" by one of his "chocolate dreams," a little pickaninny clad in a white suit. It stood next to its descendant, a modern Waverley electric, manufactured in the same factory just eleven years later.

Following is a list of the pleasure cars exhibited: Buick, Baker electric, Columbia, Chalmers, Cadillac, Cole, Columbus electric, E-M-F, Firestone, Halladay, Hupp-Yeats electric, Locomobile, Marmon, Overland, Oakland, Oldsmobile, Pierce-Arrow, Rauch & Lang electric, Reo, Regal, Rambler, Royal Tourist, Stearns, Thomas Flyer, Velie and Winton.

In the truck exhibit were shown the Avery, Grabowsky and Schurmeier vehicles.

Fig. 3—At the control, where the cars were brought to a stand and the contestants paid attention to the cravings of the inner man

Fig. 4—Another view of the contestants and their automobiles, ready to proceed after a rest

Spoke Material Running Short

FOREST SERVICE BULLETIN INDICATES THAT HICKORY IS BECOMING SCARCER WITH EACH SUCCEEDING YEAR

A SHORTAGE in the hickory supply is imminent. Virgin hickory, which has hitherto furnished the chief supply, is disappearing rapidly, and there are no foreign sources which can be drawn upon when the home supplies are exhausted. It will soon be necessary, therefore, to depend entirely upon the second growth. The maintenance of the supply is of vital concern, because no satisfactory substitute has as yet been found.

Forest owners, with some justice, regard the hickories as inferior trees, but there is one important consideration in their favor: large sizes are not required. With oak, black walnut, black cherry, yellow poplar, and other important hardwood trees, there is a great increase in value with size, because the heartwood is most valuable and timber of large dimensions is needed. But with hickory, the only increase in value with size comes from the increased number or size of the clear billets or strips which can be obtained from a tree. Sapwood is now preferred to heartwood and the younger and faster-grown material is tougher than the older and the slower-grown. For most of its use hickory can be cut when it is 8 or 9 inches in diameter and from 40 to 60 years old, while oak generally must be from 18 to 20 inches in diameter and from 100 to 120 years old.

The forest owner who considers only present prices, and the slow growth and low yield per acre, is likely to cut out his hickories to make room for faster-growing species; and he will never plant hickory. Prices, however, are bound to advance, because of the high technical value of hickory, coupled with the fast-diminishing supply. Current prices can advance considerably without affecting the trades. At present the stumpage values range from 2 to 33 per cent. of the value of the finished product and average less than 10 per cent. The costs of manufacture and of transportation are still the largest item in the cost of a spoke or of a rim strip. Unless some entirely new material is found to take the place of hickory, and this seems quite improbable, it is only a question of time when the prices will advance sufficiently to place hickory on an equal footing with chestnut, poplar, and other faster growing species; even now it is practically on an equal footing with white oak and white ash, the other trees most important for toughness and strength used for purposes similar to those for which hickory is used.

With the hickories on an even footing with other important timber trees, with the hardwood forests of the country under proper management, and with the drain decreased through a lessening of waste, there should be no difficulty in producing all the hickory that is needed for home consumption, with some over to supply much of the foreign demand.

There are now about 100,000,000 acres of forest land on which hickory is growing naturally, although not necessarily in pure stands. In most places the forest has been wastefully cut and severely burned and pastured, so that it is in a low productive condition. It must soon become the object of care and attention. Because of their naturally good reproduction, their ability to endure shade and to grow under many different conditions of soil and climate, the hickories are particularly amenable to forest management, and a little intelligent care can greatly better both quantity and quality of the yield.

The two principal methods by which the supply can be maintained are economic and silvicultural. The first depends upon hickory users, and will consist in reducing waste and improving the economic position of the tree; the second lies in the hands of the forest owners, and will consist in the proper care of the tree in the forests with a consequent increase in the quantity and betterment of the quality of the crop. User and producer must act together, for without a reduction of waste there will be too severe a tax on the hickory resources to produce enough timber even with special attention given to the production of a greater supply. Without an improvement in the economic position of the tree, no attention will be paid to the production of new supplies, and hickory will still be cut out to make room for faster-growing trees. The problem therefore lies primarily in the hands of the hickory users, and it will be necessary to secure closer co-operation among them.

For the prevention of waste, the following recommendations are made:

1. Grading rules should be revised to stop unjust discrimination against heartwood and birdpecks. This will do away with most of the waste, and if such new rules are put in operation and made effective, they should reduce the annual cut at least 15 per cent.

2. Overproduction should be prevented, because hickory wood is so quickly attacked by borers that material which is not immediately disposed of is almost invariably subject to heavy loss.

3. There should be less specialization in the manufacture of hickory. For instance, skewers, small handles, and dowel pins could and should be manufactured only as by-products in the making of spokes, axe handles, rims, and shafts, and spokes and handles can be made in connection with rim or pole and shaft operations. This will not only permit a closer utilization of material at the mill but will make it possible to utilize more closely in the woods. Economy of this sort is now practiced by many companies, but it should be carried much further. The best example of the wastefulness of the present methods is the riving out of spoke billets and handle blanks in the woods. The superior quality of rived billets and spokes is due largely to the fact that only the best material is taken and the rest is left or, perhaps, sold as firewood. Sawing should be substituted for riving, because, by sawing, many more—often twice as many—spokes and handles can be gotten out, and much of the present waste can be utilized for hammer and hatchet handles, skewers, dowel pins, and other uses.

To place the hickories upon an equal commercial footing with other trees, two measures are imperative. In the first place, a cubic foot log rule should replace the inaccurate and unjust rules now in use. The cubic measure, used everywhere in Europe and in some places in this country, is much more accurate and satisfactory for general use than the board foot measure, and it is especially applicable in the case of hickory, because it is not usually cut into boards or planks but into piece stock.

In the second place, there should be a general advance in prices to permit of higher stumpage values. It is inevitable that such an advance must come, and the sooner the advance begins and the attention of forest owners is drawn to the value of hickory, the less danger there will be of a serious shortage with accompanying high prices and general inconvenience. Higher prices, moreover, will not only encourage the care of the hickory in the forest, but will also be a most effective means of reducing waste and forcing closer utilization.

To produce spoke and handle material, which takes more than half the annual cut of hickory, no method seems better than reproduction by sprouts. Sprouts grow faster than seedlings for the first fifty or sixty years, and produce heavier yields per acre; where sprout reproduction is at all successful it is less uncertain than seedling reproduction.

A simple clear-cutting for coppice growth, which can be used with oak and chestnut, will not, however, apply to hickories as

they occur in mixed stands, because faster-growing species invariably outstrip and suppress the hickories so that they appear only on the edges or in the openings of such mixed stands. But there are many old fields and pastures, especially in the Ohio Valley, which are coming up to pure stands of hickory, and there the coppice method could be applied successfully. Since the sprouting capacity falls off very rapidly as the tree grows older, the cutting should begin as soon as the trees are large enough to use, which will be when they are from 8 to 9 inches in diameter and from 40 to 50 years old. The stand may then be cut clear.

Pure stands, however, are uncommon and it will often be advisable to plant hickory with the idea of ultimately managing it as a sprout forest. Because of the danger from squirrels and mice, Fall planting should not be attempted. The nuts should be kept over Winter between layers of sand and planted in the Spring, and since the long taproot makes transplanting impracticable, the nuts should be planted directly in the permanent site, and never in a nursery. The spacing should be about 5 feet by 5 feet and two or perhaps three nuts should be placed in each spot about 2 inches under the surface, or it might be well to try a group mixture with a light-seeding species, such as white ash.

Care should be taken to plant only those species which are suited to the soil conditions. On exposed situations or on dry or sandy soils pignut is to be preferred, and even that demands a moderate amount of fertility to produce timber of good quality. On moist or wet soils big shellbark should be selected, and on fresh, fertile soils either shagbark or pignut. The latter furnishes the better grade of wood.

To secure the normally rapid growth essential to the production of strong wood, the stand should not be allowed to become over-crowded. Thinning should begin about the twenty-fifth year. The crooked or defective trees and those which are being crowded and have not room enough to grow should be removed. Eight or ten years later the thinning may be repeated. At the end of the next ten years, if the soil is fertile, it is barely possible that the stand may be ready to cut, but since seedling stands grow more slowly than sprout stands, it will usually be necessary to wait an additional ten years before cutting. In this case another ten-year thinning should be made, and by the fiftieth or sixtieth year the stand should be merchantable, and should then be cut and managed as a sprout forest.

Intelligent cutting can increase greatly the proportion of hickory in the forest and can improve the quality of the wood by hastening its growth. In such a forest the hickories finally should be cut when they have reached a diameter of about 12 inches. At this diameter, on moderately good soil, they will be increasing in volume at the rate of about 4 per cent. a year; at 14 inches the increase is about 3 per cent., and at 16 inches 2 1-2 per cent.

It will not be wise, however, to establish a hard and fast diameter limit, because the condition in which the stand is to be left must be taken into consideration. Smaller trees may be cut wherever there is promising young growth to take their places. If it is desired to increase still further the proportion of hickories in the stand, the trees should be left longer, and they must also be left longer where the other species are cut to a large diameter limit or where it is impossible to give the stand much attention.

A peculiar feature of the tolerance of hickories is the remarkable rapidity with which they recover from suppression. After being suppressed for from sixty to eighty, or even one hundred years, during which time they reach diameters of only a few inches, they are able to respond to the stimulus of increased light and immediately begin to expand their crowns and put on heavy layers of wood. A tree which has been suppressed and is then freed by an opening in the forest cover will often develop at a faster rate of growth than that of a normal tree of the same size and diameter which has never been suppressed. This capacity for enduring shade is so strong in pignut and shagbark that the largest diameter increase may come at the age of 150 or even 200 years.

Most of the hickories now standing are either seedlings or sprouts from small stumps.

The hickories are comparatively slow-growing, especially the true hickories, which are even slower-growing than white oak. A 200-year-old white oak growing under the same conditions of light and soil as a shagbark or pignut of the same age often will have almost twice the diameter and will yield from two to four times as much merchantable material. The accompanying table shows the time required for a normal hickory tree to increase 1 inch in diameter in various sections.

The hickories are long-lived trees, the section of big shellbark in the Morris K. Jesup collection in the American Museum of Natural History in New York showing 340 annual rings. The oldest shagbark and the oldest pignut found grew in West

TABLE SHOWING TIME REQUIRED FOR A NORMAL HICKORY TREE TO ADD AN INCH TO ITS DIAMETER IN VARIOUS SECTIONS

Diameter breast-high.	Eastern Maryland and Pennsylvania.		Ohio Valley.			Northern Ohio.		Cumberland Mountains.			Mississippi Valley.			
	Pignut	Mockernut	Pignut	Shagbark	Bitternut	Pignut	Shagbark	Pignut	Shagbark	Mockernut	Pignut	Shagbark	Mockernut	Shellbark
Inches:	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.	Yrs.
1	11	10	9	9	9	11	9	11	9	8	11	8	7	13
2	11	8	8	9	8	10	9	11	8	8	10	8	7	11
3	10	8	8	8	8	9	9	10	8	8	9	8	7	11
4	9	7	8	8	7	8	9	10	8	8	8	8	7	11
5	8	7	7	8	7	8	9	9	8	8	8	8	7	10
6	8	6	7	8	6	8	8	9	8	8	8	8	7	10
7	8	6	7	8	6	8	8	8	8	8	8	8	7	10
8	7	6	7	8	6	8	8	8	8	8	8	8	7	9
9	7	6	7	8	6	8	9	8	8	8	8	8	7	9
10	7	6	7	8	7	8	9	8	8	8	8	8	7	9
11	7	6	7	8	7	8	9	8	8	8	8	8	7	8
12	6	6	7	8	7	8	9	8	8	8	8	8	7	8
13	6	6	7	8	8	8	10	8	8	8	8	8	7	8
14	6	7	8	8	8	8	10	8	8	8	8	8	7	8
15	6	7	8	8	9	8	11	8	8	8	8	8	7	8
16	6	7	8	8	10	9	.....	8	8	8	8	8	7	8
17	6	7	8	8	.....	9	.....	8	8	8	8	8	7	8
18	6	8	8	8	.....	10	.....	8	8	8	8	8	7	8
19	6	8	.....	.....	.....	10	.....	8	8	8	8	8	7	8
20	6	8	.....	.....	.....	11	.....	8	8	9	8	8	8	8
21	6	8	.....	.....	.....	11	.....	8	8	9	8	8	8	8
22	6	8	.....	.....	.....	13	.....	8	8	10	8	8	8	8
23	6	9	.....	.....	.....	.....	.....	8	8	10	8	8	8	8
24	6	9	.....	.....	.....	.....	.....	8	8	11	8	8	8	9
25	7	10	.....	.....	.....	.....	.....	8	9	.....	8	8	8	9
26	7	.....	.....	.....	.....	.....	.....	8	9	.....	8	7	8	10
27	7	.....	.....	.....	.....	.....	.....	8	9	.....	8	7	8	.....
28	7	.....	.....	.....	.....	.....	.....	9	9	.....	8	7	8	.....

Virginia and were each 350 years old. Mockernut is apparently shorter-lived. Mature trees of shagbark and pignut are usually from 200 to 300 years old and grow in the virgin forest along with white oak and other long-lived species.

A serious injury from the commercial standpoint, though of little danger to the life of the hickory, is what is known as "birdpeck." This is a discoloration of the wood caused chiefly by the work of the sapsucker, which, especially in the Spring, drills into the cambium of the tree after the sap. The hole cuts off the flow of sap, and a black streak from one-eighth to three-eighths inch wide extends a foot or so above and below the wound along the line of the pores affected. This streak probably does not affect seriously the strength or toughness of the wood, but it does affect the appearance, and the prejudice against "streaky hickory" is very strong. The damage is very extensive, and an immense amount of wood—perhaps as much as 10 per cent. of the merchantable material—is left in the woods on account of birdpeck.

The living hickory trees support a large number of different kinds of insects, some feeding on the leaves, others on the nuts, and still others on the bark and wood of the twigs, branches, and trunks, but there is only one species responsible for any extensive dying of the trees. This is the hickory barkbeetle (*Scolytus quadrispinosus*) which, during the past ten years, has been directly responsible for the death of so much of the best hickory timber throughout the area in which the hickory grows, but especially in the northern section of its distribution, from Connecticut to Wisconsin. Wood of the living trees, especially of the younger ones, is injured to some extent by wood-boring grubs or larvæ of several species of long-horned beetles of the genus *Goes*. The wood of dying and dead trees, and of saw-logs, handles, poles, and other unseasoned products with the bark on, is often seriously damaged by various kinds of wood-boring beetles and larvæ. The sapwood of all kinds of hickory wood products, even after seasoning, is subject to great damage by various species of powder post insects. In short, insect injury has contributed greatly to waste in hickory, and has reduced revenues and profits. Practical methods of preventing losses from these insects have been determined and may be adopted and successfully carried out at slight expense.

A very serious defect of hickory trees is "cup-shake." This occurs commonly in the heartwood of mature trees in those portions where the growth has been very slow, and consequently a number of open porous layers come together. It is most common where the porosity of the wood is increased by a large amount of moisture in the soil, and therefore most likely to occur in Southern hickory. There are two ways by which loss from this source can be entirely avoided—first, by keeping the trees growing steadily, so that no succession of narrow rings will be formed, and, second, by cutting them before they reach large size.

Young hickories are very susceptible to frost. Out in the open, without protection from an older stand, they are apt to be killed back by frost, and this forms one of the chief objections to growing hickory in plantations in the northern part of its range; it has proved an obstacle to the introduction of the hickories into Germany, where big shellbark and mockernut are too sensitive to grow successfully. Bitternut, pignut, and shagbark are unquestionably the least susceptible to frost, and pecan and water hickory the most.

A source of considerable injury in some places is the practice of bumping or striking against the trunks of young shagbarks or big shellbarks with a heavy object or a long pole to shake down the nuts in the Fall. It causes serious defects, if not actual decay in the wood.

The supply of large hickory which hitherto has been depended on, is rapidly approaching exhaustion, and it will soon be necessary to depend entirely upon the second growth. Since the hickory-producing woodland is owned mainly in small holdings, such as farmers' woodlots, the perpetuation of the supply depends largely on the care of these woodlots by individuals. Stumpage prices are comparatively low, and the economic position of the tree is still further lowered by unjust and inaccurate log rules. Of the merchantable hickory cut each year fully 40 per cent. is wasted.

The technical value of the wood differs greatly within the same species under similar silvicultural conditions, and even within an individual tree. Often these differences cannot be accounted for, but in general the wood put on by a thrifty tree during the period of its greatest vigor is the best, and the wood from the butt cuts is superior to that from the upper cuts. Within the limits of normal growth the width of the rings is not a measure of the technical value of the wood, and for thrifty trees of the same age there are no differences in value according to geographic regions or local soil conditions. Strength and toughness are not affected by the change from sapwood to heartwood. The best criterion of the value of the wood is its weight.

Specifications place white hickory, or sapwood, in a higher grade than red hickory, or heartwood, though there is no inherent difference in strength. In fact, in the case of large and old hickory trees the sapwood nearest the bark is comparatively weak, and the best wood is in the heart.

To help prevent shortage in the supply, hickory users should take action to prevent waste through placing red hickory upon an equal footing with the white, to secure economy in usage through closer co-operation.

Castles in Spain

Did Boyish Dreams Come True, How the Map Would Look!

LOOKING backward affords a perspective of the doings of every man; the difference between the dream of youth and the reality of manhood would stand out like a steeple against a favorable skyline, and many men who are now making a failure of what they are trying to do would be doing something else. Let it not be supposed that all youthful dreams are elevating; the point to be made will be illustrated by a true story. A little boy who resided in our street, being the pride of his mamma, was asked by her in front of company what he intended to be when he grew up. Prompt as a fiddler, he said, "I intend to be an ash-cartman, mamma!"

But most youths dream of greater conquests; why enumerate them? None will read these lines without being able to recall some impossible dreams. Castles in Spain, there are a-plenty; they are in ruins, crumbling into dust before the eyes of man, just as they are raised in beauty by the boy.

Funny, though, come to think of it. Looking about discloses many men who should have kept right on building castles in Spain—they would do less damage; the crumbling to dust of a few of such castles is a matter of no great moment. But you take the man who, instead of being what he wanted to be, as he peered into the future with calves' eyes, is putting cold-rolled steel into automobiles; what of him? Then there is the fellow who selects tires for automobiles; they are not the kind that are of a size enough to tote the load; what kind of a castle did he see on the horizon as a boy? He must have had all the delights of a pirate who pranced up and down the raging main from Cape May to Pernambuco.

But measure the chap who uses a can of condensed milk with which to stick the rear wheels fast to the jackshaft, or if he leaves out the milk the wheels will come off for sure, although the milk is not a lasting guarantee; what a vivid imagination he must have had as a boy! Can there be any question about the man who substitutes brass castings for die-forged steel levers in the brakes? Perhaps he had a hunch that he would like to be an undertaker. Last, there is the chauffeur, the man who never goes "joy riding," never takes a commission on tires, keeps the car as spick and span as a piano, is as prompt as time, polite, obliging, takes a daily bath and knows his place; what in the name of common sense did he dream of when he was a brown-eyed boy in knickerbockers?

Modern Abrasives

A PAPER READ BY GEORGE N. JEPPSON BEFORE THE ANNUAL MEETING OF THE SOCIETY OF AUTOMOBILE ENGINEERS LAST WEEK

THE grinding wheel and the special machine for its use have reached a state of development where they are receiving appreciative attention in the mechanical world. The worker in metals recognizes that these tools have their useful field and the production engineer, in considering the proper method to be used in developing a finished machine part, must consider the grinder, would he compete with his progressive brother.

No industry has served more to bring before the world the utility of these tools than the one you represent, and I believe you will agree that the production of the automobile of to-day, with its ball and roller bearings, special alloy steels, and precision in all its essential rotating parts, would have been practically impossible without the grinding wheel and the machines on which it is used.

It was comparatively easy for the mechanical world to accept the artificial wheel of emery and corundum to take the place of the file on castings, and later to displace the grindstone in the sharpening of tools, and at about the same time, the earlier forms of surface and cylindrical grinding of hardened steel machine parts, for the obvious reason that the grinding wheel here had a clear field, and there were no recognized prejudices or habits to overcome. But as soon as we entered the field occupied by the lathe builder and the lathe hand, we had a campaign of education on our hands, which has, in the end, met with success.

The metallurgist has also in recent years created new fields for grinding, by the many new combinations of the elements with iron, giving us alloys which are difficult to machine in the old way. Those of manganese and iron can be machined only by grinding.

Abrasives in Use To-Day

My contribution to-day will be on the grinding wheel. The essential parts of its structure are the bond and the abrasive. The abrasive, which forms the cutting teeth of the wheel, is graded into grain of standard sizes and the grain to be used is selected according to the duty it is to perform, and not only the size of grain must be considered, but also the temper or toughness, as well as the hardness. No abrasive in use to-day is the best on all materials. They each have their field, some because of their natural physical properties, and others because their composition allows them to be bonded better than others for certain classes of grinding.

In the following microphotographs, I will show the abrasives in use to-day and comment on them in detail.

No. 1 Naxos Emery	Analysis
Aluminum Oxide	67.13
Ferric Oxide	15.54
Silica	2.72
Titanium Oxide	3.75
Calcium Oxide	.43
Magnetic Iron	8.43
Loss	2.73

This abrasive is being rapidly replaced by the more efficient artificial abrasives. It has, however, still a use in those wheels used for certain grinding processes such as for steel balls. Wheels for this purpose must be bonded very hard, and the roughness of the surface of the grain and the high percentage of impurity allow this to be done with wheels made of emery. As an abrasive for general grinding purposes, it is not as efficient as the modern electric furnace product.

Corundum	Analysis
Aluminum Oxide	91.05
Ferric Oxide	3.45
Silica	3.00
Titanium Oxide	.25
Calcium Oxide	.82
Loss	1.24

This is a natural abrasive. Its quantity is limited and its quality lacks uniformity. Where the quality is good, it is an efficient abrasive on soft and heat-treated steels.

Regular Alundum	Analysis
Aluminum Oxide	91.25
Ferric Oxide	2.50
Silica	1.75
Titanium Oxide	4.35
Calcium Oxide	.25
Magnetic Iron	1.25

This abrasive is made in the electric furnace, and is produced from bauxite, a hydrate of alumina. Bauxite is purified in the electric furnace so that the product is high in crystalline aluminum oxide, and it is probably the most efficient abrasive known on steel. Its quality is under control and the quantity is unlimited. This naturally stands for duplication in wheels so far as this is practical and possible.

Fig. 1—Naxos emery

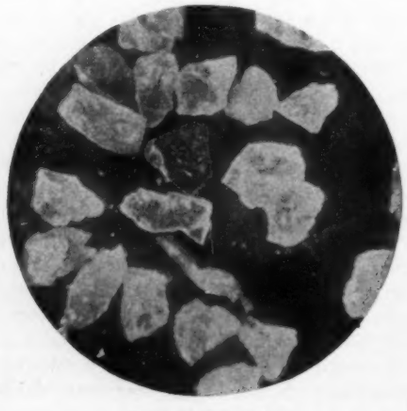


Fig. 2—Corundum

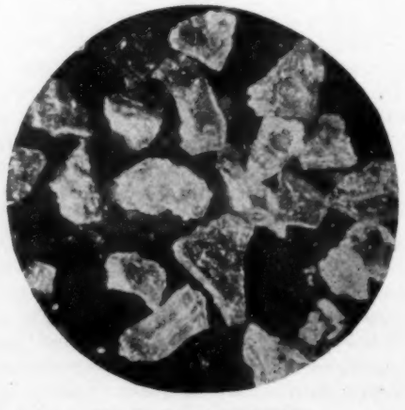


Fig. 3—Regular alundum

Special Alundum	Analysis
Aluminum Oxide	99.17
Ferric Oxide	.65
Magnetic Iron	.15
Silica	.16

The greatest advance in recent years in the making of artificial abrasives is the art of being able to fix the toughness or what we call the "temper" of an abrasive. Very hard metals, like hardened tool steels, require for their efficient grinding an abrasive which is hard enough to penetrate the surface ground and tough enough to remove its chip without breaking off or dulling too quickly. If it breaks immediately, we are grinding on a lap without cutting points. The professional grinder says "grinding on the bond." If it is so tough that the cutting points just dull, you have increased the area of each tooth to such an extent that the friction in making the cut is so increased that we have heat and at the same time our depth of cut possible is decreased, and we have an inefficient wheel. The material shown in Fig. 4 is the most efficient material known for the grinding of all classes of special hard and tough steel.

Fig. 4—Special alundum

Carborundum	Analysis
Silicon	67.50
Combined Carbon	28.57
Aluminum Oxide	.85
Ferric Oxide	2.06
Silica	1.08
Titanium Oxide	.13
Free Carbon	.44

Carbide of silicon, otherwise known as carborundum or norcolite in this country, and in Europe under various other names, is an artificial abrasive made in the electric furnace from coke and sand, and is the hardest abrasive in use. It is the most efficient we have on cast iron, chilled iron and brass. In most cases it gives the desired finished surface, but where a high finish is desired the carbide of silicon wheel is used first in the roughing operation and the finish is put on with a wheel of an aluminous abrasive. In cylindrical grinding with wheels of carbide of silicon the main objection is in the wear of diamonds used in truing the wheel. I have a record of an alundum and carborundum wheel where 25 cuts of 1/1000 each were taken with the same diamond on both wheels. Careful weighings showed that ratio of wear was alundum 1 to carborundum 4 1-2.

Function of the Bond

The function of the bond is not only to hold the cutting particles of the wheel together and to give the wheel the proper factor of safety at the speed it is to be run, but it must also be possible to vary its tensile strength to fit the work it is called upon to do. We often hear the operator say that the wheel is too hard or too soft. He means that the bond retains the cutting teeth so long that they become dulled, and this wheel is inefficient; or in the case of a soft wheel, the bond has not been strong enough to hold the cutting teeth and they are pulled out of the wheel before they have done the work expected.

The bond to be used for a given operation depends on the wheel and work speeds, area of wheel in contact with the work, vibration in wheel spindle or work, shape and weight of work, and many other like variables.

Wheels are bonded by what are known as the vitrified, silicate, elastic and rubber processes. Were I to enter into a detailed description of these bonds, it would require considerable time, and I will therefore only speak briefly on the essential features of each.

No one bond makes a superior wheel for all purposes; each one has its field.

Vitrified Wheel

This bond is made of fused clays, is unchanged by heat or cold, and can be made in a greater range of hardness than any other bond. It does not completely fill the voids between the grains, and, therefore, a wheel bonded in this way having more clearance than any other, is adaptable for all kinds of grinding except where the wheel is not thick enough to withstand side pressure. This bond has no elasticity.

Fig. 5—Carborundum

Silicate Bond

This bond is composed of clays fluxed by silicate of soda at low temperatures. It is not as stable as the vitrified bond as regards dampness, gives less clearance between grains, and has a range of hardness below that of the vitrified in the harder grades. This bond has no elasticity and will not make a safe wheel of extreme thinness.

Elastic Bond

This bond is composed of shellac and other gums. It completely fills the voids of the wheel, has a limited range of grades, has a high tensile strength and elasticity, and can be used for the making of very thin wheels. The rubber or vulcanite bond has the general characteristics of the elastic, but its grades of hardness cannot be varied to the same extent and its uses are limited.

Proper Combined Abrasive and Bond

From what I have said about abrasives and bonds you have probably come to the conclusion that given a certain grinding operation you must, in order to have the most efficient wheel, have a combination of right abrasive and proper bond. In order to show conclusively that the abrasive of which crystalline aluminum oxide is the cutting property, such as emery, corundum or alundum, is superior to carbide of silicon on metals of high

Fig. 6—Vitrified wheel.

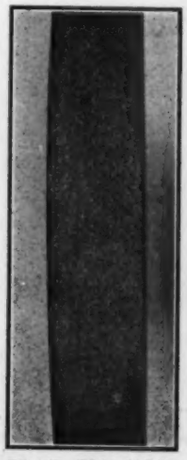


Fig. 7—Silicated bond

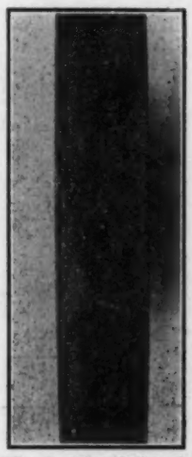


Fig. 8—Elastic bond

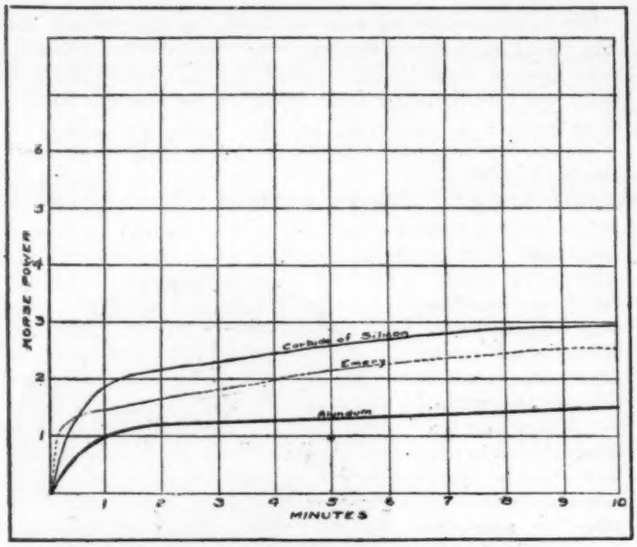


Fig. 9—Curve sheet indicating the efficiency of alundum

tensile strength, such as alloy steels, high and low carbon steel and wrought iron, and also to show that carbide of silicon is superior on metals of low tensile strength, such as cast and chilled iron, the following tests have been made:

Testing Apparatus

The apparatus used was a motor-driven Norton Cylindrical Grinding Machine, of the 14 x 72 size, equipped with ball bearing spindle, tachometers for recording revolutions per minute of the work and wheel spindle, the electrical energy used being registered on a Westinghouse graphic ammeter. The efficiency of the abrasive wheel we considered to be measured by the horsepower required to do a given operation. All conditions of the tests were constant, except the abrasive wheel. The test-piece was of 25-point machinery steel, 2 inches in diameter and 24 inches long. The abrasive wheels were the best we had available for the purpose.

The following curves were developed from these tests:

Curve Sheet No. 1

An analysis of the curves shows that alundum is the most efficient abrasive for this work. It is easy to explain the efficiency of alundum as compared with emery. Both abrasives are of the same nature chemically, the only difference being that alundum is of greater purity. It is known that the higher the percentage of crystalline alundum oxide the more efficient is this type of abrasive. Why carbide of silicon, which is harder than emery, corundum or alundum, should be less efficient on steel than even emery is not so easy for the layman to understand. The reason is that emery lacks the property of toughness. By test, as compared to alundum, it is in the ratio of 1 to 4. This means that in the grinding of steel, a metal one of whose properties is high tensile strength, the cutting tooth is broken off close to the bond and we are then grinding on a cutting surface composed to a large extent of bond. The wheel, having neither cutting teeth nor clearance, quickly glazes. Some who have used this material on high carbon steel and got a highly burnished bluish surface at the expense of time and horsepower may correctly assume that they were grinding on a lap consisting of carbide of silicon and porcelain bond.

Before we leave this curve I would call your attention to the rapid rise in horsepower in the carbide of silicon and emery wheel. In the carbide of silicon this is due to the fact that the brittle tops of the cutting teeth are immediately wiped off, leaving the duller wheel, with consequently greater consumption of horsepower. The emery wheel, being composed of a softer material, also loses its cutting teeth, but, being tough, not to the extent that you get down to the bond as quickly as in the case of the carbide of silicon wheel. The alundum wheel shows a more consistent curve, this material having the properties of toughness and hardness so combined as to make it of the highest efficiency on metals of this class.

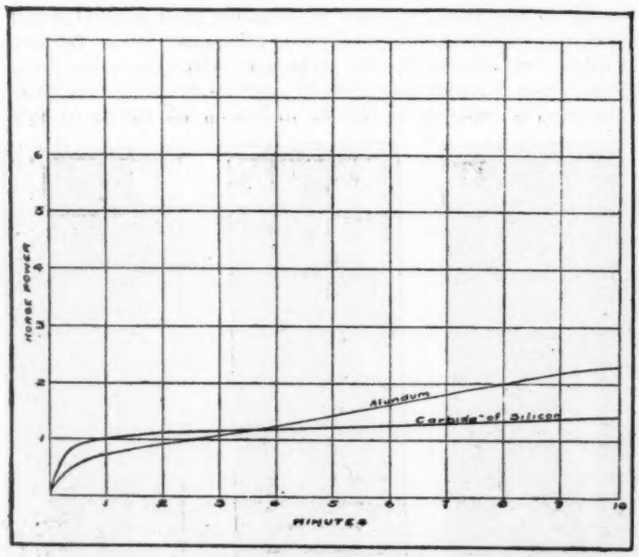


Fig. 10—Curve sheet, showing relative efficency of alundum and carbide of silicon on cast iron

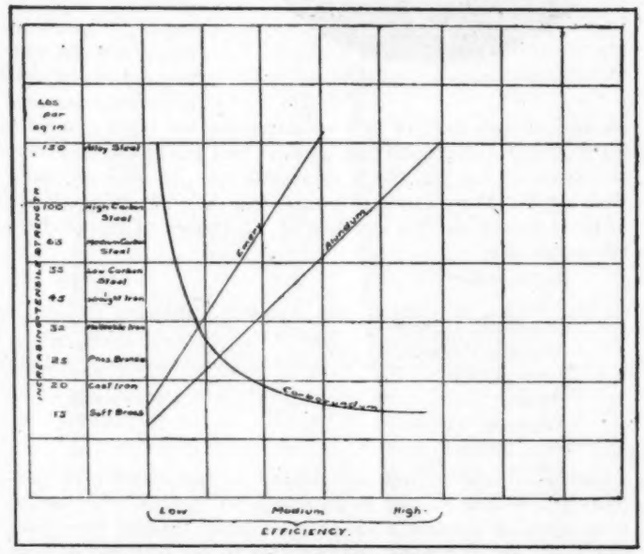


Fig. 11—Curve sheet, showing relative efficiency of emery, carborundum and alundum

Curve Sheet No. 2

This chart shows the relative efficiency of alundum and carbide of silicon on cast iron. You will note that here the alundum wheel is superior to the carbide of silicon up to the fourth period, but after passing this point the carbide of silicon becomes more efficient, the reason being that the grain is tough enough to withstand the light work it has to do in cutting metals of low tensile strength. Its hardness also serves to keep its cutting teeth sharp.

Curve Sheet No. 3

This chart shows the relative efficiency of the abrasives in question, and may be of assistance in determining the kind of abrasives to be used.

In conclusion, I believe that with the general interest which is now being shown in the grinding wheel and machine, and the fact that the wheel is becoming recognized as a cutting tool rather than a grindstone, rapid advances will be made in the near future in the art of grinding.

Questions That Arise

SOME OF THOSE THAT COME UP IN EVERY-DAY AUTOMOBILING ARE ANSWERED BY THE MATTER PRESENTED BY FORREST R. JONES IN THE NEW EDITION OF THE "AUTOMOBILE CATECHISM."

[338]—What is a radiator fan?

A fan of the propeller type used to insure the passing of sufficient air over the outer surface of the coil. It is usually hung in a frame back of the radiator and driven by a belt from a small pulley on the engine shaft. Thus a current of air is passed through the engine space even when the car is at rest, if the motor is running; otherwise the air current would be practically nil and the engine would quickly overheat. In some cars the fan blades are incorporated in the flywheel, and the bonnet is made "tight"—the air being drawn through the radiator and discharged under the car, back of the flywheel.

[339]—What causes the cooling water to circulate?

Either a pump (forced circulation) or the heat imparted to it by the cylinder and combustion-chamber walls (thermal circulation).

[340]—How should the piping be connected for thermal circulation.

A pipe for carrying the hot water from the jacket to the radiator should run from the highest part of the jacket space to the upper portion of the radiator. The top of the radiator must be higher than the highest part of the water-jacket space of the engine. Another pipe should connect the bottom of the radiator to the jacket space at or near its lowest point. With this arrangement the heat imparted to the water in the jacket space causes the water to rise and flow out through the pipe connected at the highest point, thus inducing circulation. The hot water which enters the upper portion of the radiator and then becomes cooled has a tendency to fall to the bottom as it cools. This also induces circulation. For the best results the bottom of the radiator should be at least as high as the point where the water enters the cylinder jacket, and the pipes should be short and without downward U-shaped bends.

If a tank is used in addition to the parts described, it should be placed as high or higher than the radiator. The connections may then lead the hot water from the top of the jacket space to the tank, thence to the top of the radiator and from the bottom of the radiator to the lower part of the jacket.

The opening through which the hot water enters the radiator should be low enough to always be covered with water even when the radiator is not completely filled. Circulation due to heat ceases when the water level falls below the hot water inlet of the radiator. The same applies to the hot water inlet of the tank, when one is used.

[341]—How is a pump used to circulate the water?

By introducing it into the circulating system so that all the water must pass through it.

[342]—Where should the pump be placed?

Preferably at the lowest part of the system, so that water will flow to it as long as any remains. This is not absolutely necessary, however. It should receive water by gravity from the tank when one is used, or from the bottom of the radiator, and force it into the lower part of the jacket space. When there is no tank it should take the water from the bottom of the radiator and force it into the jacket.

[343]—What class of pumps are used for circulating the water?

The rotary class in the automobile. That is, those in which the water is impelled through the system by a rotating part inclosed in a casing.

[344]—What types of rotary pumps are used?

The centrifugal and the fixed-volume-per-revolution (positive) types.

[345]—How does a centrifugal pump operate?

A rotary part (rotor or runner) with radial (or curved) vanes revolves inside a casing which incloses it. Water flows in at the axis (center) of the rotor and is thrown out by centrifugal action to periphery. An outlet at the circumference of the casing leads out tangentially in the direction of motion of the part of the rotor nearest it.

[346]—If the water circuit becomes completely closed by the stoppage of a pipe, what is the result with a centrifugal pump?

The pressure will be increased slightly and less power will be required to drive the pump than when there is free circulation. The water in the pump will be whirled around by the rotor, but none will pass out.

[347]—How does a fixed volume (positive) rotary pump operate?

The volume of liquid passes through the pump in the same way per revolution, whatever the speed of the pump or the resistance to flow in the circuit. There are two characteristic types. One has an ordinary pair of intermeshing spur gears inclosed in a tight-fitting case, which extends around something more than half the periphery of each gear. Water is drawn in at one side or edge of the case between the gears and forced out the opposite side.

In another type a cylindrical rotor is placed eccentrically in a tight cylindrical case. The rotor is provided with radial wings or vanes, which are held out against the cylindrical wall of the case so that each rotation takes in a fixed amount of water at one side of the rotor and forces it out on the opposite side. Other forms are used.

[348]—What effect has the stoppage of a pipe on a fixed-volume (positive) pump?

The pump continues to force the water through its discharge opening and increases the pressure till the pump stops or something gives way. As a matter of fact, fixed-volume pumps usually have so much leakage between the rotor and casing that they cannot increase the pressure to a dangerous point.

His Knowledge Was Very Limited.—Australia is progressive and its "barristers" are clever. The following is reported as having transpired in a certain Australian palace of justice. As the story is related, a case was called and, according to the testimony, the relict of a late citizen was trying to collect five thousand pounds sterling as balm, claiming that a certain respected citizen, who owned a big car, ran her man down one night, resulting in his demise. The owner of the car was driving at the time of the accident, but his chauffeur was sitting at the left hand. When the owner of the car took the stand he testified that he was so busy trying to dodge the poor man that he had no time to notice anything else, putting it up to the chauffeur to clear up all the remaining points. The witness managed very well, making clear and lucid answers to questions, much to the disgruntlement of the legal representative (of the injured party), who finally said, "Was the car equipped with headlights, or only oil lamps?" "Headlights," answered the witness. The owner of the car won in the case, and his lawyer was so elated that he congratulated the chauffeur on his qualities as a witness. when the chauffeur said, "I thank you, sir, but if that lawyer had asked me if the headlights were burning I would have had to tell him that they were dead; I forgot to take 'carbide' along, and when it came dark there was nothing to do but to depend upon the oil lamps and they were out of order."

Letters From Subscribers

THIS DEPARTMENT IS DEVOTED TO THE ANSWERING OF LETTERS FROM SUBSCRIBERS ON ANY SUBJECT RELATED TO THE RUNNING OF AUTOMOBILES

Wants to Know About the Barograph

Editor THE AUTOMOBILE:

[2,468]—There have recently been so many attempts at the world's altitude record that in order to understand how the readings are taken I should like to know how the altitude is approximated. H. C. R.

Baltimore, Md.

The readings are taken on a chart in the same manner as the barometer records the difference in climatic changes. The chart reproduced in Fig. 1 shows three trials at the record in France previous to the late Ralph Johnstone's record. It shows the time taken to arrive at the highest point and the time to descend. In the center chart the speed of the descent can easily be determined after allowing for the momentary rise at a height of 1,500 feet before landing.

Wiring Diagram of High-Tension Magneto

Editor THE AUTOMOBILE:

[2,469]—How should the connections be made from the battery and magneto to the coil and switch on a Remy magneto?

New York. H. F. LANDON.

The method of wiring is clearly shown in Fig. 2. The center wire from the distributor is attached to the top terminal of the coil, and, as the others are marked in colors, there should be no chance of making a mistake.

Some Queries as to Tire Pressures

Editor THE AUTOMOBILE:

[2,470]—I should like to know approximately the difference in the pressure in the tires after they have run some distance and become comfortably heated. Should this be allowed for when pumping up tires; that is to say, should the tires be pumped so full that when the expansion takes place with the heat there will be sufficient pressure, or should this extra pressure be disregarded?

Syracuse, N. Y. A SUBSCRIBER.

The tires should be pumped up to the pressure either recommended by the makers or to the correct amount as recently described in THE AUTOMOBILE. The chart as shown in Fig. 3 gives approximately what such extra pressure represents in different size tires. In hot Summer weather, when the tires are soon heated, some small allowance should be made if carbonic acid gas is used for inflation, as it expands more than atmospheric air.

Fitting Low-Tension Igniter to Existing Motors

Editor THE AUTOMOBILE:

[2,471]—Can a low-tension magneto be fitted to a car without fitting an eight-cam camshaft? I have a motor I would like to fit in a boat and I have been advised that this is a better method than high-tension owing to the possibility of water getting on the magneto and the effect of damp when the boat is not in service.

Mamaroneck, N. Y. A. GIBBS.

It is possible to fit vertical shafts driven by bevel gears that would have to be fitted to the camshaft, in a manner similar to that used on several Italian cars and as used in this country by the Premier (Fig. 4) by fitting igniters in the valve covers. There are several high-tension magnetos on the market that are made for marine work and they are entirely encased so that water will not affect them. The one advantage with a low-tension magneto is that with a four-cylinder motor, provided the magneto delivers current, one can always be sure of getting home, as it is seldom the case that all the tappets give trouble, and they are simple to repair if a few extra parts are carried in the boat.

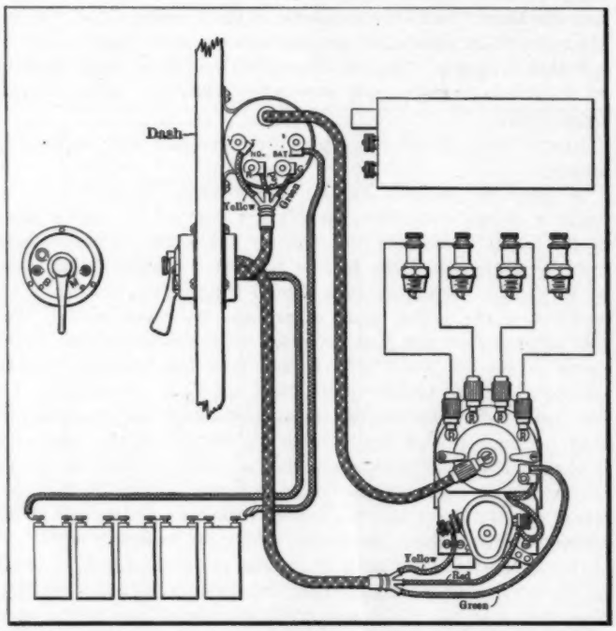


Fig. 2—Showing method of wiring from battery and magneto to coil and switch on a high-tension magneto

Transmission Grip Bands Must Rub

Editor THE AUTOMOBILE:

[2,472]—When the grease in the transmission of my motor gets warm and the car is standing still with the engine running, the grease squirts out and, after running about 150 to 200 miles, after filling the transmission plumb full with grease, the brake bands and the rest of the transmission get so much grease on them that I must scrape it off before wiping them clean. The transmission is of the planetary type. Of course, the grease does not come out when on high gear. Can you tell me a remedy for this, and would it be possible to make some kind of a clutch that the transmission could be left on high gear with the engine

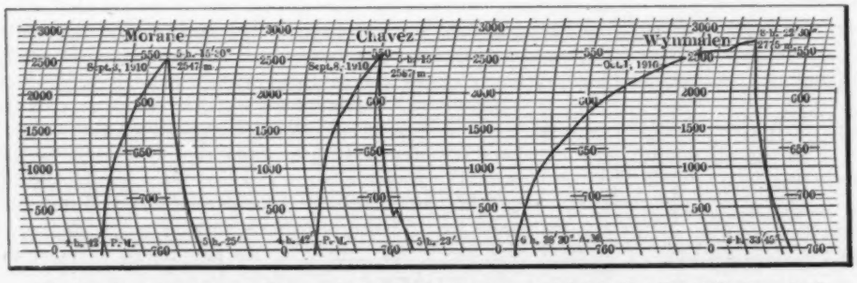


Fig. 1—Showing barograph record of aeroplane ascents in trials for the altitude record

running and the car standing still? I have tried very heavy graphite greases, taken the transmission apart and put it together (and noticed that the fibers were not worn), but the grease came out as before. CONSTANT READER.

St. Louis, Mo.

For the best result it will be necessary to so adjust the transmission grip-bands that they will not rub when the car is standing still and the motor is running. The next good plan requires that the transmission case be cleaned out thoroughly, after which the sparse use of heavy cylinder oil or a fine grade of grease should be practiced.

Use Cyanide of Potassium in Hardening

Editor THE AUTOMOBILE:

[2,473]—I have just fitted adjusters of the bolt and check-nut type to the valve lifters on my motor. Will you kindly tell me how I may harden the bolts so that they will better withstand the pounding they receive from the valve stems?

Rutherford, N. J. F. E. ROGERS, JR.

Heat the nut to a deep cherry red, daub cyanide of potassium over the surface, heat again and then quench the nut in cold water to which you may add a handful of common salt.

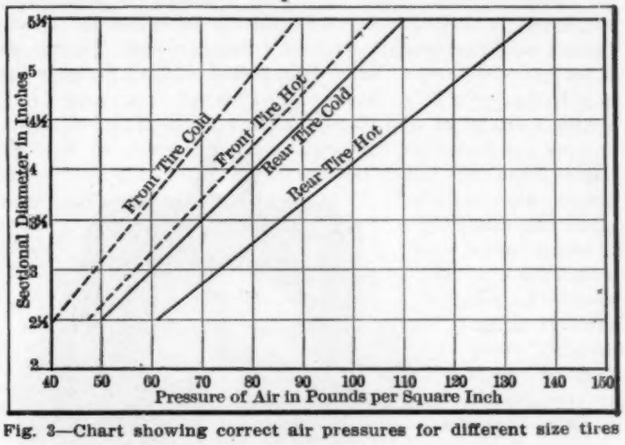


Fig. 3—Chart showing correct air pressures for different size tires

To Decrease the Wear on Tires

Editor THE AUTOMOBILE:

[2,474]—I own and drive a six-cylinder 60-h.p. car which weighs without passengers 3,940 pounds. I usually carry four passengers, who will average 150 pounds each, making a total weight of 4,540 pounds.

I seldom drive at a speed of over 25 miles per hour; start slowly and stop slowly, using the brakes sparingly. Most of my driving is over good macadam roads. My tires are: Front 34 x 4, rear 35 x 4 1-2, which I keep inflated at 100 and 80 pounds respectively. I have never had a blowout, few punctures, but no end of wear. My front shoes will go 5,000 miles, but few of the rear will go over 2,800 before the tread is worn through to the canvas. I even heal up all the small cuts with plaster, but in spite of all my efforts and cares very few of the rear shoes will go over 3,000 miles.

Can you imagine what the trouble is, or suggest a remedy?

Staten Island, N. Y. W. L. HENRY.

We should suggest your having the car weighed and seeing the amount the front and rear tires have to carry, and from the schedule you can see if the sizes of the tires at present fitted to your car correspond with the sizes indicated. If they are smaller it is necessary to have larger tires fitted if you wish to obtain satisfaction and good mileage. You say that you keep more air in the smaller of the two tires and also that you get increased mileage from these. This goes to show that you might with advantage pump the rear tires harder. You must also take into consideration that the life of the rear tires cannot be expected to be as long as the front ones.

Weight Per Wheel

26 x 2½	225 lbs.	28 x 3¼	380 lbs.	32 x 4	650 lbs.
28 x 2½	225 "	28 x 3½	400 "	33 x 4	680 "
30 x 2½	225 "	30 x 3½	450 "	34 x 4	700 "
26 x 3	350 "	31 x 3½	500 "	36 x 4	750 "
28 x 3	350 "	32 x 3½	550 "	32 x 4½	700 "
30 x 3	350 "	34 x 3½	600 "	34 x 4½	900 "
32 x 3	350 "	36 x 3½	600 "	36 x 4½	1000 "
34 x 3	350 "	30 x 4	550 "	34 x 5 over	1000 "
36 x 3	350 "	31 x 4	600 "	36 x 5 over	1000 "

Proper Air Pressure for Tires

45 lbs.	in 2½ inch tires.	70 lbs.	in 4 inch tires.
50 lbs.	in 3 inch tires.	80 lbs.	in 4½ inch tires.
60 lbs.	in 3½ inch tires.	90 lbs.	in 5 inch tires.

Might Be Better to Send It Back to the Maker

Editor THE AUTOMOBILE:

[2,475]—Being a subscriber to your paper, I take the liberty of asking you if you know of any firm in the East that makes a practice of magnetizing magnetos? I have a magneto that needs to be magnetized and would like to have it done in the East in preference to shipping it West. Kindly name the nearest place I can get it done. GEORGE JACOBS.

East Rochester, N. H.

In case you do not wish to return the magnets to the maker of the magneto, you will have the option of inquiring of the various laboratories whether or not they will undertake the task, although the charge might be too much. It would also be possible to get the work done at Columbia or some other university.

There Is Only One Rule for a Racing Driver

Editor THE AUTOMOBILE:

[2,476]—I am 18 years old and would like to become a racing driver. Could you inform me as to where I could secure the rules and regulations of the track, and where I could secure any information about racing? NELSON DONALD.

Boonton, N. J.

Granting that there are innumerable details which you will have to learn by actual experience, the fact remains that there is only one rule, and that is, win.

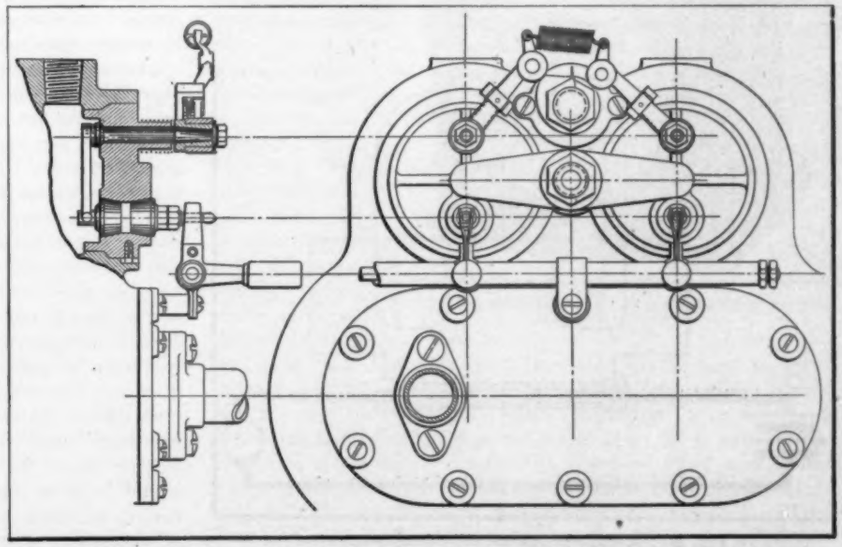


Fig. 4—Method of fitting low-tension igniters and strikers in valve caps of gasoline motor.

Ampere-Hour Meter for Electrics

PAPER READ BY R. C. LANPHIER AT ANNUAL MEETING OF SOCIETY OF AUTOMOBILE ENGINEERS

DURING the past two or three years the production of electric vehicles, both pleasure and commercial types, has witnessed an enormous increase, due to the extreme simplicity of the electric vehicle, as compared with the gasoline motor type. It naturally follows that, with the increased production, manufacturers of storage batteries and other equipment entering into the construction of electric vehicles have greatly improved their product, and there has been also a closer observation of results obtained with electric vehicles than several years ago, when their operation was always more or less of a hit-or-miss proposition.

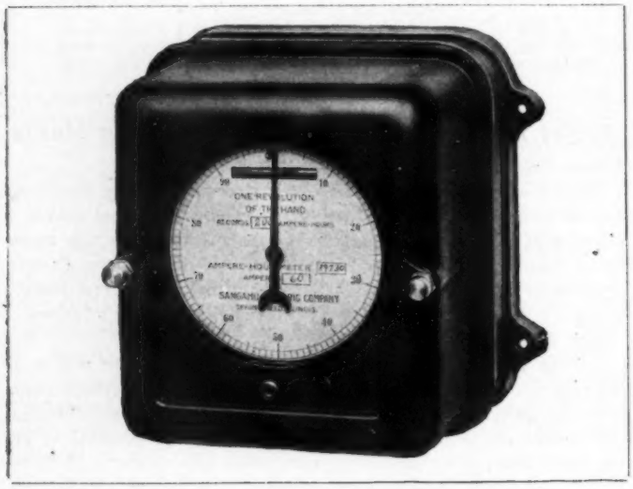


Fig. 1—Automobile type of ampere-hour meter

The improvement in storage batteries—the vital feature of an electric vehicle—has, of course, been most marked, both in lead batteries and in the introduction of improved Edison batteries.

In the earlier days of the electric vehicle no one gave much consideration to a careful measurement of the performance of the battery, depending almost entirely upon readings of more or less reliable indicating instruments and upon occasional tests for specific gravity. The ammeter and voltmeter are undoubtedly useful on electric vehicles under certain conditions, if properly understood by the operator of a car, but these instruments are subject, first, to rapid deterioration on account of the tendency to become injured by the vibration and pounding of a vehicle in service, and, second, they give no permanent record of the condition of a battery with respect to charge; in other words, the ammeter and voltmeter indicate from moment to moment the varying values of current and voltage delivered by, or to, a battery, but make no record of the quantity of electricity which has passed through them. Taking an analogy of a cash register, these instruments are, on an electric vehicle, what a cash register would be to a merchant, if it merely showed the amount of each purchase and made no total record to check up by at the end of the day.

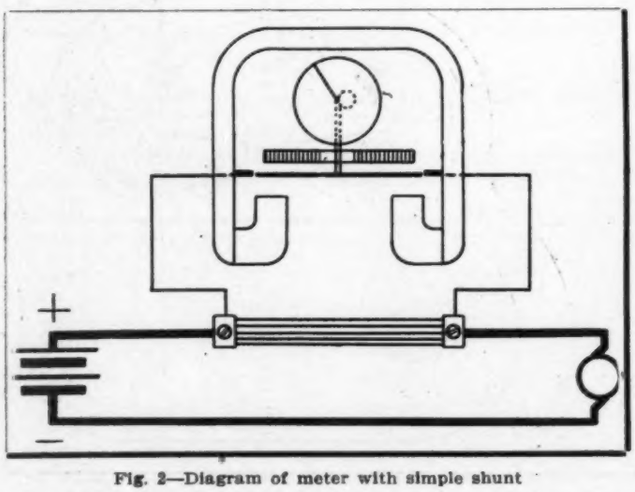


Fig. 2—Diagram of meter with simple shunt

While, therefore, it may be desirable to have a voltmeter and ammeter on a vehicle when used by persons properly understanding their meaning and purpose, yet it is unquestionably far better if an instrument is used which requires no knowledge of electricity or the electrical conditions attending the charge and discharge of a storage battery, and this requirement is met only by an ampere-hour meter.

Fig. 8—Service type of ampere-hour meter, with totalizing circles on dial

The ampere-hour meter is designed to do the very thing the ammeter and voltmeter cannot do—that is, to record and show on a dial the quantity of electricity which has been drawn from or put into a storage battery, being, in a sense, like a gauge in a bucket of water. With a lead battery it is, of course, true that the only ultimate and absolute test of its condition with respect to charge is the specific gravity of the electrolyte, but as the rise or fall in gravity is directly proportional to the total charge and discharge in ampere-hours, it is evident that a properly designed ampere-hour meter becomes practically a true measure of the specific gravity of the battery and, therefore, an indicator of its condition with respect to charge. Of course, in saying this, it should be understood that the internal loss of the battery by discharge cannot be recorded on the ampere-hour meter, and an allowance in the readings of the meter must be made for this, as mentioned later. Evidently, if it were possible to conveniently indicate direct the specific gravity of a battery at all times, one would have an excellent means of showing its condition with respect to charge. But the nature of a hydrometer makes such an instrument practically impossible. While some users of elec-

tric vehicles may take the trouble to test several cells of their battery from time to time while running the car, thereby ascertaining the condition of the battery with respect to charge, provided the readings of the hydrometer are properly understood, yet this seems at best a very doubtful expedient, particularly when one considers the allowance that must be made in using the hydrometer for varying atmospheric temperature, age of battery, etc.

The Sangamo ampere-hour meter as designed for use on electric vehicles is practically a Faraday motor, as applied to meter purposes. The meter consists essentially of a copper disc submerged in mercury contained within a molded insulation receptacle, and with contacts imbedded in its walls, so that load current may be carried into and out from the submerged copper disc, which is therefore the armature of the little meter motor. In close proximity to the disc, on each side of its axis, are located the poles of a powerful permanent driving magnet, as shown in Fig. 2, so that the reaction of the current passing through these fields causes a driving torque varying with the intensity of the field and the strength of the current flow. With a constant field from the permanent magnet the only variable is the current, so having a proper speed control for the moving system, obtained by the usual damping disc and permanent magnets, we obtain a meter varying in its rate only with current and time—that is, an ampere-hour meter.

The elementary Faraday disc principle is illustrated in Fig. 3, where current is shown passing between a brush contact A at the shaft of the copper disc, and one at its lower edge A^1, the line of current flow between the contacts being shown by dotted lines. The current in passing between the poles of the permanent magnet S is reacted upon so as to cause a torque, thus producing rotation in the direction of the arrow on the disc. The application of this principle to the ampere-hour meter is shown in Fig. 2, this being the original type with simple shunt.

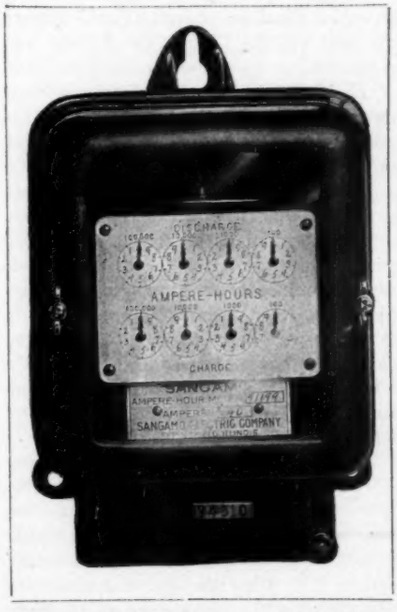


Fig. 9—Service type of ampere-hour meter, with "duplex" recording train

The ampere-hour meter is of the simplest possible construction, having no moving wires or coils to get out of order, and the copper armature, being completely immersed in mercury, gives a flotation to the entire moving system, so that no amount of jarring and vibration can damage either the moving system of the recording mechanism driven from it.

In Fig. 4 is shown a cross-section of the motor element of the ampere-hour meter, which will give a clear idea of the relation of armature, mercury, contacts and damping disc above the mercury chamber. In this view the large permanent magnet, with its poles immediately below and close to the bottom of the mercury chamber, is omitted for the sake of clearness.

In operation the meter shows little variation from the theoretically correct speed over a range from a small percentage of full load to very large overloads, and is therefore particularly adapted to the conditions of electric vehicle work. Typical curves are shown in Fig. 5.

It may be interesting at this point to mention how the ampere-hour meter came to be developed for electric vehicle service. The company with which I am connected had been manufacturing mercury motor watt-hour meters for a number of years, and during the summer of 1908 this led to a suggestion on the part of Mr. Ernest Lunn, superintendent of storage batteries for the Commonwealth Edison Company, that the same principle might well be applied to ampere-hour meters, first for use as indicators of the floating point for standby central station batteries, and later for use on electric vehicles. Following Mr. Lunn's suggestion, we developed the first ampere-hour meters, which were put in service over two years ago on trucks of the Commonwealth Edison Company in Chicago. These original meters gave, and have continued to give, excellent service.

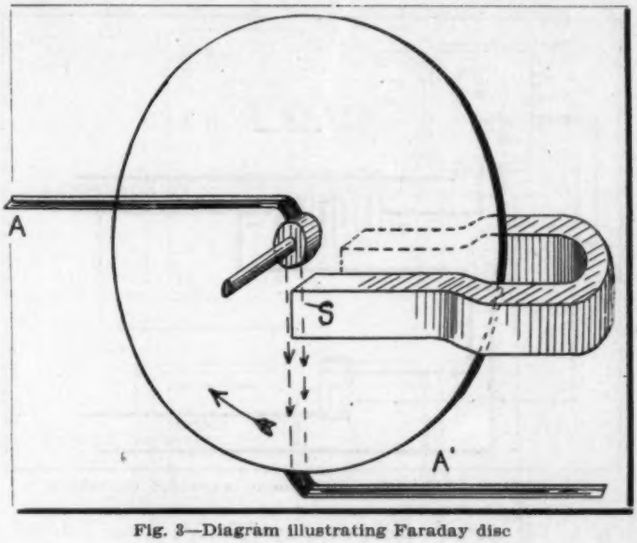


Fig. 3—Diagram illustrating Faraday disc

Differential Shunt

As originally brought out, the meter was always operated in sizes above 10 amperes' capacity, with simple shunt designed to pass a proper proportion of the total load current through the armature chamber of the meter—that is, the measuring element proper. With this type of shunt the meter runs at exactly the same rate forward — that is, on discharge of a battery, as backward, or on charge. The meter with simple shunt is, therefore, suitable for a great many uses where it is not desired to have the meter run faster on discharge than on charge, to compensate automatically for the efficiency, or rather "inefficiency," of the battery. After producing a number of meters with the simple shunt, we found it would be desirable to furnish a meter with some type of shunt, or other mechanism, which would cause it to run faster on discharge than on charge, preferably by an adjustable percentage. We therefore devised what we term a "differential shunt," as shown diagrammatically in

Fig. 10—Automobile type of ampere-hour meter, with case removed

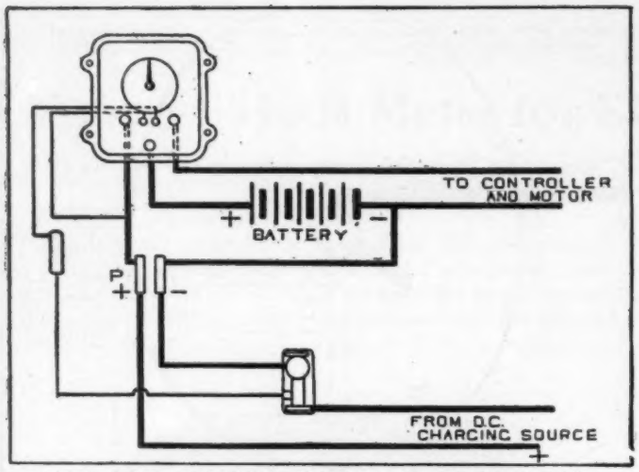


Fig. 7—Meter with differential shunt connected on vehicle

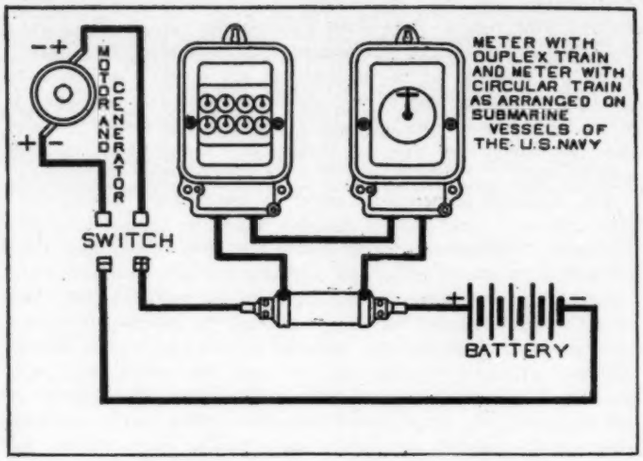


Fig. 12—Diagram of meters on submarine boat

Fig. 6. For use on vehicles or electric boats a meter with differential shunt should generally be selected, as this enables necessary overcharge being given the battery each time it is charged without manipulation of the meter on the part of the operator. The differential shunt consists essentially of two current-shunt elements within the meter, each similar to the simple shunt as used in the original meters, but connected in a special way and with an adjustable element, so that the meter will run slower on charge than on discharge, thus giving a battery automatically the necessary percentage of overcharge every time it is charged. The general application to an electric vehicle of a meter with differential shunt is illustrated diagrammatically in Fig. 7. The percentage of overcharge obtained by the differential shunt is easily adjustable, and some change in this percentage will usually be found desirable for wide variation in atmospheric temperature or increasing age of battery. The differential shunt can be arranged either to make a meter run correct on discharge and slow by a variable percentage on charge, or correct on charge, and fast by a variable percentage on discharge. The former arrangement has been found preferable in practice, as the thing an operator wants to know about a battery is exactly how many ampere-hours have been discharged, and it is generally immaterial as to just how many additional ampere-hours of charge are put in, if this is taken care of automatically by the shunt.

As to the percentage of overcharge desirable for batteries in vehicle service, it has been found that the usual type of lead batteries operate very nicely if the differential shunt is set for about 15 per cent. overcharge, although in some cases, where the vehicle is operating under best conditions, a less percentage of overcharge is sufficient. For Edison batteries the Edison Storage Battery Company recommends an overcharge of 20 per cent., and this has been adopted by one of the largest vehicle manufacturers using a great many Edison batteries and been found to maintain these batteries in excellent shape.

The arrangement of ampere-hour meter, with differential shunt, while intended to give, automatically, necessary overcharge to a battery, should never be depended upon absolutely for long periods, as there are inevitably some internal loss in any battery and some error due to varying discharge rates, which the meter does not take account of. A car often stands several days without being used, in which case there will have been some considerable leakage or internal discharge, which cannot show on the meter. To avoid error due to this, and also to get best results with the battery, a special charge should be given before starting out after such an interval. In case of the lead battery this extra charge should be, as usual, in charging, until battery reaches maximum gravity and voltage. With the Edison battery the gravity does not change during charge or discharge, and the voltage is not a very reliable guide as to the exact condition of the battery with respect to charge, so that an extra charge depending largely upon the length of time the battery has been standing without use, and determined somewhat by experience, will be found desirable. The Edison battery cannot be injured by considerable overcharge, so that when a periodical extra charge is required it is best to be on the safe side and give the battery more than absolutely necessary. Aside from this, a battery should be given an occasional extra charge, say once every two weeks, entirely independently of the reading on the ampere-hour meter, so as to bring it up to a full gravity, as shown by hydrometer test, if a lead battery; or to maximum voltage and a maximum overcharge, if an Edison battery. There is no harm done, and a full charge is most desirable.

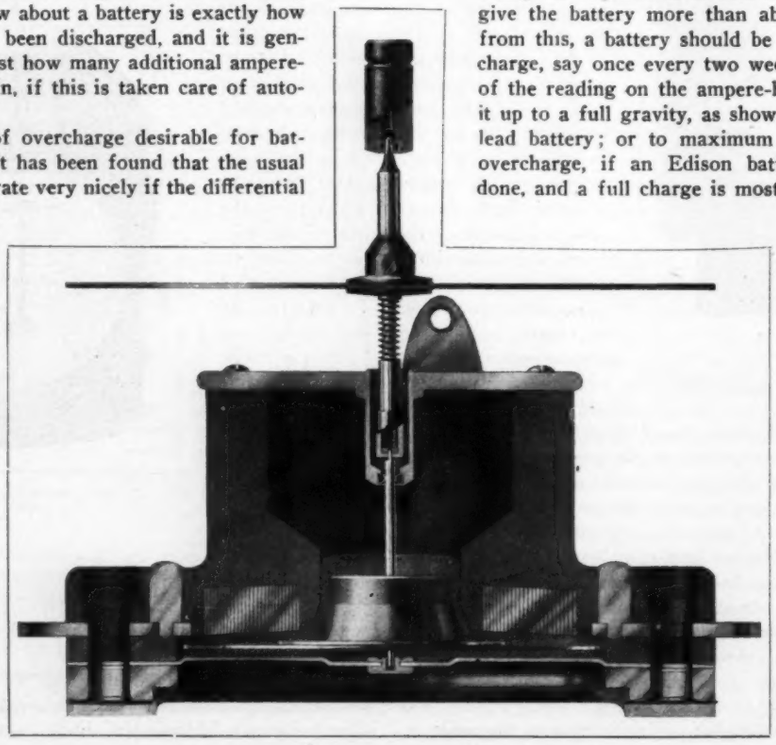


Fig. 4—Cross-section of motor element of meter

The contact feature as used in ampere-hour meters is an insulated platinum-tipped pin at the zero point on the dial connected to one side of an auxiliary circuit leading from the meter, the other side of this circuit being connected to the indicating hand; thus when the dial hand goes back on charge and touches the pin at O, this action can be made to operate a shunt trip coil circuit-breaker to open the charging circuit in which the meter is connected in the manner as will be appreciated.

The stop-charge feature of the meter is one of its most useful in electric vehicle work, as it enables one to start the charge on a battery with the assurance that the charge will be stopped when the battery is properly charged by actual ampere-hours input and not on the basis of reduction in rate of charge, as is the case with the stop-charge obtained by a mercury-arc rectifier.

Following the development of the meter with large circular dial, having the moving hand adapted simply to show alternate cycles of charge and discharge, a dial was designed having totalizing circles, as shown in Fig. 8, the purpose of these being similar to the dial on an ordinary electric house meter—that is, to sum up over any period the total current either charged or discharged through the meter. The gears driving the hands on the totalizing circles are so arranged that the hands move only when the large indicating hand is moving in one direction. The ratchet device in the gears can be set so that the totalizing hands record either total charge or total discharge, as may be preferred, but not both. As a general thing, a meter of this type is desirable for use on electric commercial wagons, where it is desired to keep a record of the total current required for operation each month, as a simple reading of the totalizing circles each day, week or month will give the amount put into or taken from the battery, depending upon whether it is desired to keep a record of the total charge or discharge.

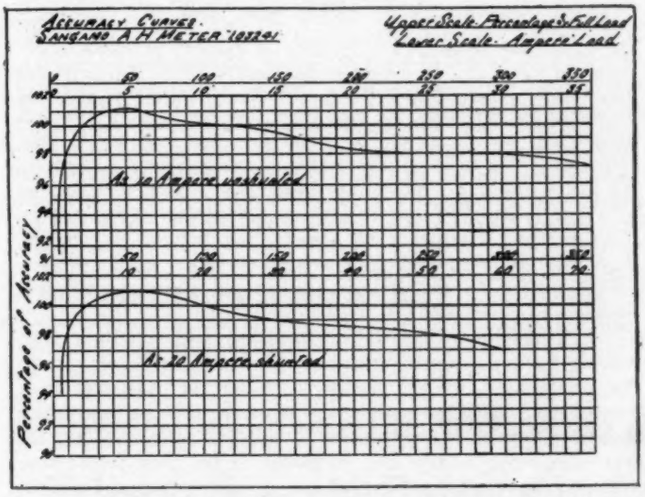


Fig. 5—Accuracy curves of ampere-hour meter

Very recently another method of using the ampere-hour meter in electric vehicle service has been tried, and in some service will prove even more useful for purpose of records than the previous types. This method involves the use of another type of recording train, called the "Duplex" train, consisting of a dial having two rows of totalizing or integrating circles, as shown in Fig. 9. The upper row records discharge and the lower row charge, the gears driving the two sets of indicating hands being so arranged that when the hands on the discharge row are moving, the hands on the charge row do not move, and vice versa. With this recording train the entire charge and discharge of a battery are correctly recorded on the one dial. As applied to an electric vehicle, the row of circles for charge is geared up so as to take into account the charging voltage, thereby enabling these circles to read in *kilowatt-hours input*, while the discharge row still reads direct in *ampere-hours output*. By taking readings from the charge row of circles at any time, one has immediately a record in kilowatt-hours of the total amount of energy which has been used in charging the battery, therefore the cost of current for operation, while by taking the reading on the discharge row in ampere-hours, dividing by the mileage from odometer readings, the ampere-hours per mile are immediately obtained, thus giving a measure of the operating efficiency of the vehicle. The charge row can readily be geared so as to read

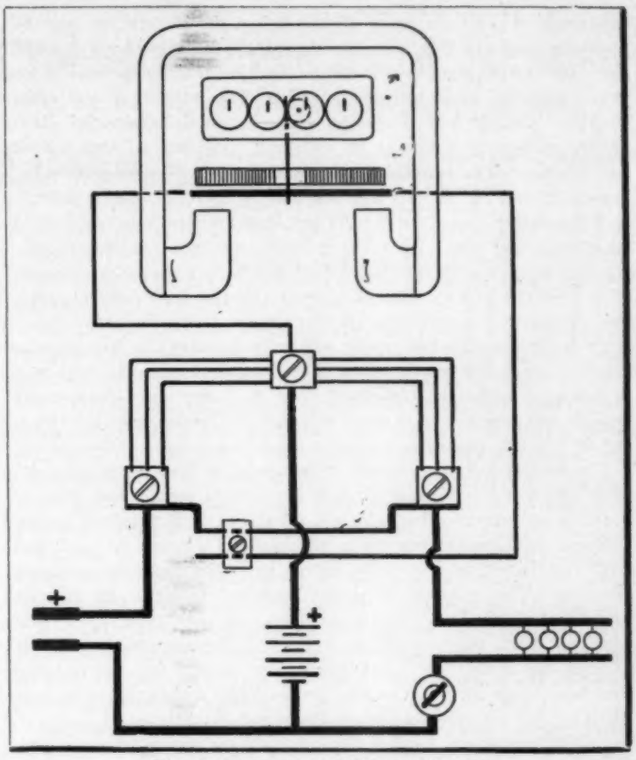


Fig. 6—Diagram of differential shunt

direct in kilowatt-hours on the basis of any standard charging voltage, such as 110, 120, etc.

Even with the ordinary type of ampere-hour meter, the ampere-hours discharge when divided by mileage gives an excellent measure of the daily performance of a vehicle by comparison with the performance of similar vehicles under similar conditions, and also under different conditions; while any trouble which may develop in the running gears, motor, etc., tending to draw excess current from the battery, is immediately indicated by increase in the number of ampere-hours per mile above the average which the vehicle has been showing.

Through the courtesy of Mr. Ernest Lunn I append a sample record sheet of a 1500-pound delivery wagon used for delivering goods from one of the large retail houses in Chicago:

Date	Miles	Ampere-hours	Ampere-hours per mile	
Dec. 12	40	140	3.5	
" 13	33	106	3.22	
" 14	36	120	3.34	
" 15	37	122	3.3	
" 16	36	120	3.34	
" 17	33	98	2.97	
" 19	35	120	3.43	Heavy going
" 20	35	112	3.2	
" 21	37	108	2.92	
" 22	36	108	3	

This record, as you will note, shows slight variation in the consumption per mile from time to time. The variation was, no doubt, largely due to the condition of the streets, the current

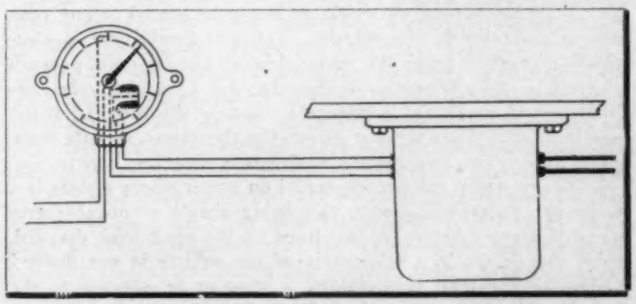


Fig. 11—Diagram of distant dial type of meter

consumption per mile being greater when the streets are covered with snow or are slippery. While this is the record of a single rig, that of a number of other similar vehicles would show practically the same uniformity of energy consumed per mile, provided vehicle and batteries were in good condition. This particular record indicates an excellent condition of the vehicle and battery. The rated capacity of this particular battery is 140 ampere-hours. If on any day the battery had run out of current and the meter had shown only, say, 130 ampere-hours, it would have indicated that either the battery was not capable of giving its rated capacity or that it had not been sufficiently charged. If the battery had run out of current and the ampere-hour meter had shown that a discharge of 170 ampere-hours had been taken from it, the conclusion would naturally be that the battery was capable of giving much more than its rated capacity and was probably in splendid condition, and that the only reason the vehicle was stuck was that an attempt was made to drive it too far on a single charge.

The success of the electric commercial vehicle is largely dependent upon its reliability. Any instrument which will make it possible to increase the vehicle's reliability is a thing of value. Electric vehicles are especially sensitive to changes in load and road conditions, and to some extent to atmospheric temperature changes. The increase in power required to drive an electric vehicle through heavy snow may be 100 per cent. over that required when the pavements are dry. The ampere-hour meter affords the driver the most convenient means for determining this percentage and will enable him to keep within the discharge limits of his battery, despite adverse road conditions.

As demonstrating further the value of the ampere-hour meter, I quote from a letter recently received from one of the largest electric light companies in the country, which has done a great deal toward popularizing the use of electric vehicles by furnishing a proper system of maintenance and charging garages throughout the city in which they are located. They say:

"We have found the ampere-hour meter to be almost indispensable in connection with the operation and maintenance of all types of electric vehicles, particularly during the winter months, as the instrument shows at all times just what we are taking out of our batteries and how much work can be accomplished with the capacity on hand. In heavy, snowy weather it enables us to give satisfactory work without having our cars stalled at the end of the day. In good weather, by reading the ampere-hour meters at noon and night, dividing ampere-hours shown by the number of miles traveled, the operator has at once a knowledge of whether his car is operating economically or not. If the ampere-hours are high he immediately turns the wagon over to the repair shop to find the trouble. In this way we have found a number of cases where bearings have not been lubricated and where brakes were dragging, all of which would have gone on for some time had we not had the ampere-hour meter."

At the present time the ampere-hour meters are furnished in two types for electric vehicles, the service type, as shown in Fig. 8, and the automobile type, shown in Figs. 1 and 10.

A new type is now in preparation which will be particularly adapted to pleasure vehicles, as the meter device will be mounted in a closed iron box hung on the frame of the vehicle like a resistance grid. The dial will be mounted in a small case about the size of an automobile clock, so it can be placed at any convenient point inside the vehicle. The dial mechanism is electrically operated from the meter below, having only a small connecting cable between, so that the dial can readily be disconnected, in case it is necessary to remove the body from the vehicle at any time, without disturbing the meter and its main connections. The arrangement is shown in diagram, Fig. 11.

A feature which has proved useful on ampere-hour meters is a maximum indicating pointer, this being simply a movable arm operated from a button in the front of the glass over the dial, which can be set by the operator of the vehicle at any desired maximum discharge, thus making a point to be watched as the limit for the movement of the indicating hand on discharge.

The indicating pointer is particularly useful for varying temperatures, and, as the battery gets old, it can be set for higher or lower limits of maximum discharge under these conditions.

For example, it is well known that if a battery gives 140 ampere-hours at the four-hour rate at a temperature of 70 to 75 degrees F., it will give only about 90 to 100 ampere-hours at a temperature of zero to 5 degrees above zero F.; so that in very cold weather the maximum indicating pointer should be set at about 95 ampere-hours as limit of discharge, while for the same battery it would be set at 140 in ordinary Summer weather.

As shown in Fig. 8, the meter with simple shunt is built with a resetting device for setting the indicating hand ahead by any desired percentage in order to give necessary overcharge. With a meter having differential shunt this feature is not necessary, but on commercial vehicles is very useful, particularly when giving the periodical overcharge, or when changing batteries, as the hand of the meter may not be at zero when the change is made. Furthermore, when the resetting mechanism is present, it is convenient to set the hand forward for any desired number of ampere-hours at the time of giving periodical overcharge, as this enables the operator to determine exactly the amount of overcharge and also permits the use of the zero contact in the meter to cut off the charge as employed in the regular cycle of operation.

It may be of interest to state at this point that the Lansden Company generally use the ampere-hour meter in a somewhat different way than I have described. The meters on their vehicles are built to run *forward* on *charge*, thus showing an increasing number of ampere-hours as the battery charges, and run *backward* on *discharge*, the idea being that the hand moves back toward zero as the battery discharges, so that zero would indicate a condition of no charge. This is a very logical way to use the meter, the one disadvantage being that it precludes the use of a fixed contact to operate with circuit-breaker at full charge.

As regards installation of ampere-hour meters on vehicles, they may be installed at any convenient place on an electric vehicle, where the dial can be observed and where the resetting mechanism is accessible, if this feature is used.

The ampere-hour meters are furnished with standard dials reading for any desired unit number of ampere-hours per revolution of the hand, for any capacity of meter, the usual dial being for 100, 200, 300, 400 or sometimes 500 ampere-hours per revolution of the hand, the only point of importance in choosing the dial value being to have one revolution of the hand record considerably more than the maximum possible discharge of the battery.

Outside of the use of ampere-hour meters on electric vehicles of the ordinary types, it may be interesting to note that the meters are now being used most successfully on storage battery street cars.

The meters are similarly used on submarine boats of the United States Navy, the arrangement being somewhat more elaborate than on electric vehicles, as each battery on these boats requires two meters, one with circular dial to control alternate cycles of charge and discharge, and the other with Duplex recording train to keep a complete record of all current charged and discharged from the battery. This arrangement is shown in diagram, Fig. 12.

A modified type of the ampere-hour meter has recently been devised for use with small storage batteries in the electric lighting of gasoline cars, particularly in those systems employing generator, battery and regulating device similar, on a small scale, to axle lighting equipment on steam railroad cars.

A line of graphic recording ammeters and voltmeters, also based on the mercury motor principle, will soon be on the market, and these instruments will, no doubt, prove of considerable value in getting acceleration curves, effect of different kinds of tires, different conditions of street, etc., in tests on electric vehicles. These instruments, having the moving system floated in mercury, the same as the ampere-hour meter, are entirely unaffected by vibration and pounding.

Benzol Fuel

SOME OBSERVATIONS SUGGESTED BY MR. FLOYD'S PAPER ON GASOLINE AT MEETING OF S. A. E.—BY HENRY HESS, MEMBER OF THE SOCIETY

MR. FLOYD has shown us that in a relatively short time we shall have reached the limit of production of petroleum distillates suitable for the present type of gasoline motor and carbureter.

Some time before that we shall be asked to pay prices that will not be pleasant to contemplate, but that will stimulate the carbureter designer and be productive of a golden harvest for every inventor of carbureters who is possessed of a good advertising instinct also.

Are we, however, really altogether at the mercy of this limited supply and of those in control of it? It would seem not.

Enormous quantities of coal are daily being converted into coke, and of coal suitable for coking there is a supply in sight for a century or two, even at the progressive rate at which we are using (and largely wasting) our store.

Only a small fraction of this coke is being produced in by-product ovens, yet the by-products are more valuable than the coke itself.

The chief by-product is coal tar. The modern chemist has found in this evil-smelling and foul coal tar a mine of the most wonderful materials. The first were the aniline dyes, then followed a host of marvelous medicinal products. Only a short time ago Ehrlich was able to announce that his specific "606" was definitely proved to be a cure for one of the world's worst scourges, in its many ramifications, and that similar derivatives bid fair to rid the world of sleeping sickness, possibly even of cancer.

And now this coal tar again bids fair to rescue us from the "Octopus" by presenting us with "Benzol."

One hundred pounds of dry coal coked in a by-product oven will yield about 68 pounds coke, 15 of gases, 10 of ammonia water and 7 of tar. We are most interested in the tar, which contains some 40 per cent. of light oils, of which again some 65 per cent. falls into the benzol class.

"Clean benzol" has been offered and used for automobile motors in Germany; its use has, however, not been attended with general success, because it was assumed that it could be used with motors and carbureters suitable for gasoline. Tests made with "raw benzols, I, II and III," have given better results, quite satisfactory, in fact; but these are not generally offered, as the manufacturers (the German Benzol Union is practically in control) prefer to market their "clean benzol," great quantities of which are absorbed by the chemical industries.

Benzols I, II and III range in specific gravity from 0.890 to 0.883, 0.875 to 0.877 and 0.870 to 0.872, a maximum range in any one grade not exceeding 0.003 and in all three of only 0.013.

Not only these three grades, but others, known as Toluol and Xylol, are eminently suitable for automobile use. One hundred pounds of coal yield 1.38 pounds of benzol, of which about 1 pound is a suitable automobile fuel.

Already there are being installed in the United States many by-product coke ovens. The day is not far distant when the old, wasteful type of coke oven will be a relic of the past.

We convert at present many thousands of tons of coal into coke each year. That would yield 1 per cent., or many hundreds of tons of suitable fuel benzols and make the automobile user independent of the present petroleum products.

The bulk of the data cited is taken from a book in German by Dr. Ostwald, "'Autler' Chemistry," being No. 39 of the Autotechnical Library.

Edison Storage Battery in Commercial Service

PAPER READ BY A. J. DOTY AT ANNUAL MEETING OF S. A. E.

THE Edison storage battery has been the subject of such wide publicity that I assume all members of the society who are at all interested in the subject of storage batteries are familiar with its theory and construction. I propose now to give some facts regarding its performance in actual service. In doing this it will be necessary to make comparisons with the lead-sulphuric acid battery which, in one form or another, has been until a comparatively recent date the generally accepted standard.

In making these comparisons I realize that the lead battery has done excellent service so far as its inherent limitations permitted and that its mechanical construction has been wonderfully improved within the past five years, resulting in increased capacity per pound of battery and in extended useful life.

In December, 1903, after three years of experiment and laboratory tests the first Edison battery was put into actual road service. Mr. Edison realized that it was far from perfect and that the quickest and best way to determine wherein and to what extent it was deficient was to put it on the road and watch it. In the meantime he continued his investigations and experiments with various changes and combinations of material and construction during the year 1904.

Up to the time when the manufacture of the "E" type battery was discontinued, about 100 batteries had been put into service. While the results obtained from these demonstrated that the battery was superior to any lead battery in commercial use at that time, Mr. Edison decided that it could be improved and he shut down his factory. Several concerns who had been using the battery for from one to two years insisted that they were good enough and wished to get more of them. Mr. Edison at first refused to supply any more but at their earnest solicitation again started up his factory and built about 150 sets of batteries, 130 of which went to one express company.

After two years more of laboratory and experimental work the "A" type of battery was pronounced by Mr. Edison to be satisfactory to him and the first complete battery of that type was put into service in January, 1909. This battery consisted of 60 cells, type A-6, having a rated capacity of 225 ampere-hours and was installed in a closed body delivery wagon of one-ton load capacity in the service of a large department store. Instructions were given to the superintendent of the store delivery department to put it on his hardest routes and keep it going. A recent test of this battery after running over 17,000 miles showed a 1 per cent increase in capacity, giving 34 per cent. over its rated capacity.

Up to January 1, 1911, upward of 2,000 vehicle batteries have been sold, representing the limit of production capacity. Additional machinery is being installed as rapidly as it can be built with the intention of increasing the output to 600 cells per day within six months and to 1,000 cells per day within one year. Allowing for an average of 50 cells to each vehicle battery, this number of cells represents only 20 vehicles per day, a comparatively small proportion of the total number of electrically propelled vehicles which should be and probably will be sold in this country in the near future.

Of the total number of Edison batteries now in service, about 70 per cent. are in new pleasure cars. Owing to the fact that the cells are made in three sizes only as compared with approximately twenty sizes of lead cells it has been found impracticable to install an Edison battery in many old vehicles which were constructed for lead batteries. The difficulty has been that the battery compartment, in nearly every case having been designed for the wider trays used with lead cells, will not accommodate the required number of Edison trays, and in addition the head room required by the Edison is higher than for lead. This circumstance has led to a misapprehension regarding the relative space occupied by the two forms of battery. As a matter of fact the cubic contents of an Edison battery of given energy capacity is much less than a lead battery of the same capacity. An A-4 battery assembled in trays occupies only 85 per cent. of the cubic dimensions of a lead battery of equivalent capacity and weighs only 56 per cent. The A-6 battery assembled in trays occupies only 67 per cent. of the cubic dimensions of a lead battery of equivalent capacity, and weighs but 48 per cent.

In designing new vehicles it is an easy matter to provide a battery compartment that will take either lead or Edison battery. This is now being done by many builders of electric vehicles.

Records of recent performances of pleasure cars equipped with Edison batteries are no doubt familar to the members. In comparing these performances with those of vehicles equipped with lead batteries it should be borne in mind that there is no such thing as a special Edison battery. All Edison batteries are alike in characteristics and a battery selected at random from stock may be relied upon to duplicate these record mileage performances under similar running conditions.

Where the very simple directions regarding the care of an Edison battery have been followed, there has been uniformly satisfactory service received. There have been instances, however, when, through carelessness or design, sulphuric acid has been put into the cells. The result has been a gradual but very marked reduction in capacity and inability to take current properly on charge. Fortunately in nearly every instance this condition has been discovered in time to prevent permanent injury. The affected cells were emptied, rinsed out with distilled water and filled with fresh electrolyte and are now apparently as good as ever.

The fact that an Edison battery cannot be injured by overcharging has been the cause in some instances of a temporary loss of capacity through evaporation of water from the electrolyte caused by unnecessary charging, leaving the plates uncovered. All that is necessary in such cases to restore the capacity is to add the requisite quantity of distilled water.

Following the success of the vehicle type battery there arose a demand for a cell of smaller capacity for gasoline engine ignition and car lighting. This demand was met by the development of the "B" type of cell having plates one-half the capacity of the "A" type. Several thousand sets of these batteries have been sold and are giving uniformly satisfactory service where used within their limit of capacity.

Police Patrol Wagons

Discussing Growing Use of Automobiles in Police and Other Municipal Departments

PROGRESSIVE municipalities are taking kindly to automobile service, and the probabilities are that police and nospital service will soon be converted to the automobile, the reasons being (a) a considerably lower cost of maintenance; (b) more expeditious service; (c) better sanitary conditions; (d) a more favorable impression upon the public at large. In discussing the various phases of this problem, no attempt will be made to present the figures of cost to those who are now trying to get along with horse-drawn patrol wagons, and ambulances, it being practically impossible to convince them of the desirability of discarding animal transportation in favor of automobiles, excepting in the enlightened communities where the citizens are ready to accept the newer service. Public servants are not at all inclined to put their constituents to the expense of discarding the equipment in hand and purchasing new equipment, unless a pressing demand is made upon them by the constituency.

It is scarcely to be supposed that the constituency will press its servants to expend money for equipment which does not seem to be necessary, nor can it be brought to a realization of the fact that it is confronted by a necessity by any means otner than that which is shown by experience. It is useless to tell the public that the only reason why its hospitals are swarming with patients is because sanitary environment is unhealthful, and the public that has been in close companionship with horses for a thousand years is not to be convinced that they are a detriment by an argument that foots up to a thousand words, or experience that extends over a period, which in all fairness does not exceed a thousand days.

It would not be difficult to convince the medical staff in the various hospitals that the automobile ambulance is better in every way, nor would it be an impossible task to pick out the intelligent members of a community and arrange with them to share the cost of the class of transportation that would put a favorable kink in the mortality record of every metropolitan district. Unfortunately, however, the medical staff in the various hospitals has very few votes, and it is not too much to say that ballot-boxes are filled to any marked degree by those who would relegate to the scrap-heap all horse-drawn ambulances.

The trouble with the average citizen lies in his aversion to the authorizaton of the payment of the first cost of the better modes of transportation, and yet the difference in first cost between automobile service and horse-drawn vehicle equipment is not so very great, it being the case that the average municipality is mulcted to the tune of not far from $800 for a span of horses, and the mortality among horses is a sufficient factor to give it representation when the figures of first cost are being made up. But all these matters are unintelligible on a basis of comparison, when the commission is composed of citizens who have an inherent capacity for understanding the horse and an equal lack of understanding of the automobile.

Fortunately, the more enlightened communities have taken to automobile transportation for all of the reasons which are good and well understood by them, and the educational process which is necessary to the spreading of the intelligent use of automobiles is going on rapidly, promising to spread to the remotest district within the near course of events, so that it will not be too much to predict that every hospital of any consequence in the United States will see its way clear to adopt the automobile ambulance within the next two or three years. It is sincerely to be hoped that the time will be shortened and a concerted effort should be made by those who appreciate the necessities of the occasion on the ground that the further purchase of horse-drawn ambulances, police patrol wagons, and fire department equipment represents a sheer waste of public funds and will soon be obsolete.

Automobile Accidents

Richard Thirsk, of Berlin, Discusses the Philosophy of Automobile Accidents

TRULY we live in an age of scientific explanation when even accidents may be explained away. Philosophers of the old school, culminating in Schopenhauer, wrote volumes to prove that an accident is nothing more than chance. It was the latter who used the famous illustration that if you happen to be going from your house at the moment a brick falls from the roof from any cause other than intentional and hits you on the head it is chance, which in this case is an accident. Manifestly he did not live in the days of psychological research and motor cars, when the vagaries of chance, together with other superstitions, have been reduced to a fine and exact scientific theory. In the old days of common sense there were many maxims for avoiding accidents; the sailor would tell you to "keep your weather eye open," while the landsman would invariably advise you to "keep cool." A South German professor warns us that in these days it is necessary to add to cool observation some knowledge of dynamics.

According to this investigator motor car accidents, presuming that the driver is a man of undoubted skill, are generally to be accounted for by the supposition that at the moment of danger the mind entirely loses its capacity for action. The writer proceeds to make this clear, taking for his standpoint the fundamental axiom of psychology—choice and reaction. By "reaction" is meant in this instance the consequence following any impression made upon the brain through the eye, the time required for such consequence being fixed at three-tenths of a second. By "choice" the psychologist designates the act of reflection which takes place in the mind in considering two or more signals before responding in action. Although this reflection is under ordinary circumstances an unconscious act it nevertheless results in a longer or shorter delay of the reaction.

When we reduce these two principles to practice and apply them to motor car accidents we find that on the approach of danger the driver has generally two courses open to him: either he must alter his course so as to steer clear of the danger, or he must put on the brake. He must be in a position of readiness and have the capacity of deciding between these alternatives at the moment of the appearance of the obstacle. In the most favorable cases five-tenths of a second elapses from the time of the reception of the idea until the consequent action takes place. Assuming that the vehicle has a speed of 60 kilometers an hour it must in half a second cover a stretch of 8 meters. Consequently it is clear that for an automobilist to be in a position to avoid any obstacle on the road he must notice it at a distance of at least 8 meters. To this must be added the fact that the steering gear and the brakes do not act immediately, some time being lost before the muscles respond to the will and the mechanism responds to the muscles. Therefore, in order to avoid a narrow obstacle such as a tree it must be observed at a distance of at least 10 meters—the broader the object to be avoided the greater the distance must naturally be. Under 10 meters no presence of mind on the part of the driver nor dependence on the steering gear or brake can prevent a collision.

There are at the same time a number of additional circumstances which help to greatly increase the danger. For instance, the given speed of 60 kilometers an hour is often exceeded in ordinary driving, whereas in racing it may increase to 120 kilometers an hour as was the case with the unfortunate car during the recent Prince Heinrich Tour through Germany. In such an instance the time and distance of observation necessary for avoiding a collision must be more than doubled. Then, too, it must be borne in mind that these computations apply only to persons whose mental faculties are perfectly clear and not weakened by overexertion or by the use of alcoholic stimulants. In conclusion the professor says that the danger of driving at more than 80 kilometers an hour increases in such a way that even the strongest nerves and the greatest care on the part of the driver of the most perfect of motor cars cannot always ensure immunity from accidents.

It Stands to Reason—

That there are mighty few merchants who would be so lacking in acumen as to place $5,000 in cash in the keeping of some of the boys who are asked to batter up freight automobiles.

That wagon grease is what the average horse-wagonmaster will insist upon using in the ball bearings of the first automobile truck that he can get into his possession.

That the merchant who depends upon such matured judgment will reach the conclusion that freight automobiles are still in the experimental stage.

That they are; but the merchant is the one who is conducting the experiment.

That experimenting in this way is high-priced business, wholly uncalled for, and that something should be done to cure the habit.

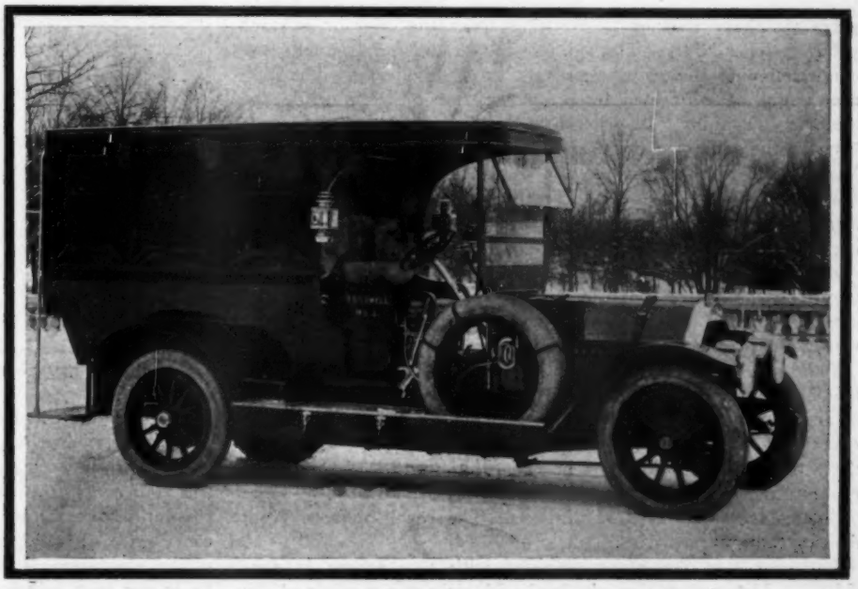
That a 6-foot diameter gong attached to a town clock will be necessary to awaken some of the sleepers.

That the "receiver" will be the man to call some of the sleepiest of them.

That men who do a large trucking business relying upon horses do not consult their wives in a business capacity.

That women would know better than to go on as some men do—horses go to the boneyard; so will the owners if they do not look out.

That the Board of Health is too busy killing mosquitos to have time to look into the extent of the serious menace which surrounds every thinking citizen in our large cities, due to the presence of horses upon the streets.



Police patrol automobile in the service of the city of Lowell, Mass. Made by the E. R Thomas Motor Company

Effect of Dual Spark

SERIES OF EXPERIMENTS MADE WITH SINGLE AND DUAL-SPARK MAGNETOS FITTED TO THE SAME MOTOR INDICATE INCREASED OUTPUT OF THE LATTER

IT has been the aim of designers of automobiles, ever since their pioneer efforts were crowned with such success as to enable the average purchaser to run his automobile with a certain amount of ease, to increase the power developed for a given size of engine. Advancement has been made in this direction in some cases by altering the shape of the compression chamber and by increasing the compression itself. In other directions lightening of such parts as pistons and connecting rods has permitted designers to substantially increase the number of revolutions and give greater acceleration. Increased efficiency comes with the advent of the magneto giving two sparks in the cylinder at the same time. Although it is nothing new to obtain two firing points in the cylinder at one time, the method of obtaining them has been the difficulty so far in order to avoid complication.

Some recent tests carried out in Germany on a six-cylinder motor with T-shaped cylinders were discussed in the *Allg. Automobile Zeitung*. The plugs were fitted in the valve covers in the manner shown in Fig. 1, and two magnetos were used, one a Bosch DU4 model, giving two sparks at the same moment, one to each plug, and another magneto of the same make, but fitted with an automatic regulator.

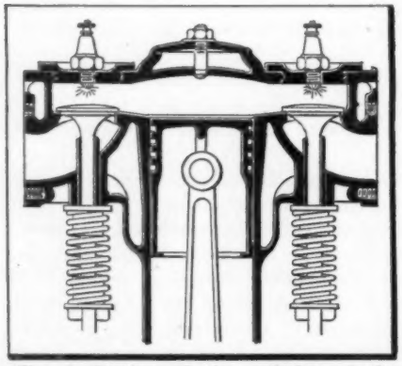


Fig. 1—Section of the cylinder of the motor on which the tests were carried out, showing position of spark plugs.

The bore of the engine was 90 mm. (3.34 inches) and the stroke 110 mm. (4.33 inches) and for the tests it was fitted on a stand with a paddle brake. The switch connections, as will be observed, were such that the double-spark magneto could be connected to both sets of plugs simultaneously or to the plugs over the inlet or exhaust valves independently. The automatically regulated magneto was connected with the plugs above the inlet valve only. The current could be connected by means of two switches while the motor was running. In order that there should be no difference between the setting of the timing lever of the two magnetos these levers were set beforehand. Between the motor and the two-spark magneto an advance mechanism was fitted, allowing the magnets to be turned toward the motor while running, and giving an advance from 0 to 55 degrees, which could be read off a scale provided. The automatic ignition was so connected to the motor that it was possible to get 36 degrees advance over the dead center. A tachometer was fitted to the motor so that the revolution readings could be taken at any time.

The tests were carried out in such a manner that with a certain carbureter setting it was possible to determine the number of engine revolutions with various ignition settings with a single spark and with two sparks at the same time. The results of these tests are clearly shown in Figs. 2, 3, 4 and 5, the abscissæ representing the ignition setting in degrees of advance and the ordinates the number of revolutions. The result as seen from the diagrams is surprising.

It shows that the curve obtained with two sparks is considerably higher than that obtained with only one spark, and the double-spark curve reaches the highest point of the single spark fully advanced when the former is set at dead center or thereabouts. It has been stated in some quarters that by the use of the double spark the ignition point falls off and no better results can be obtained than when a single spark is used in the proper

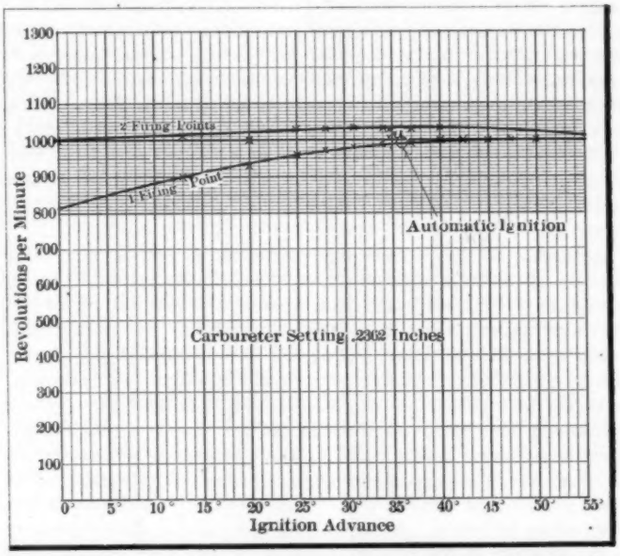


Fig. 2—Curve of number of revolutions, showing difference between the two ignitions and a carbureter setting of .2362 inch

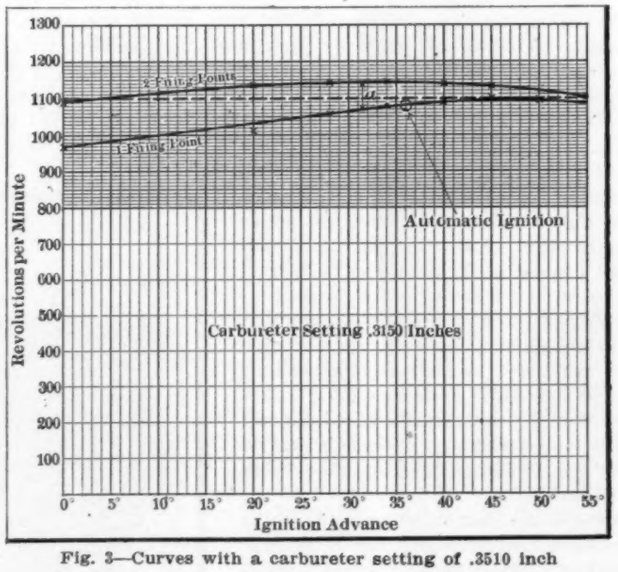


Fig. 3—Curves with a carbureter setting of .3510 inch

setting. But the curves show that ignition by two sparks gives more output when set slightly before the dead center. The extra amount can be seen at the point a in Figs. 2, 3, 4 and 5. In Fig. 2 it represents 30 revolutions more, or 3 per cent.; in Fig. 3, 40 revolutions, or 3.6 per cent.; in Fig. 4, 60 revolutions, or 5.3 per cent., and in Fig. 5, 50 revolutions, or 4.2 per cent.

The maximum power is obtained with a setting of from 30 to 35 per cent. advance. This unexpected result is undoubtedly due to the absolute precision by which the two separate sparks

fire the gases quicker as well as causing a more perfect combustion. In experiments on the car the fact is brought out that not only is more power given out, but the acceleration is also increased, when after running slowly the throttle is opened. Observation of the exhaust confirms this point. Firing with only one spark the well-known pungent odor is noticeable, especially with retarded spark, but with the double spark in consequence of the more complete burning the exhaust is nearly odorless.

One can easily read from the curves the increase in power given at the different settings of the ignition. The increase in engine speed when the second spark is switched on is, for instance, as seen in Fig. 5 with a setting of 25 degrees advance,

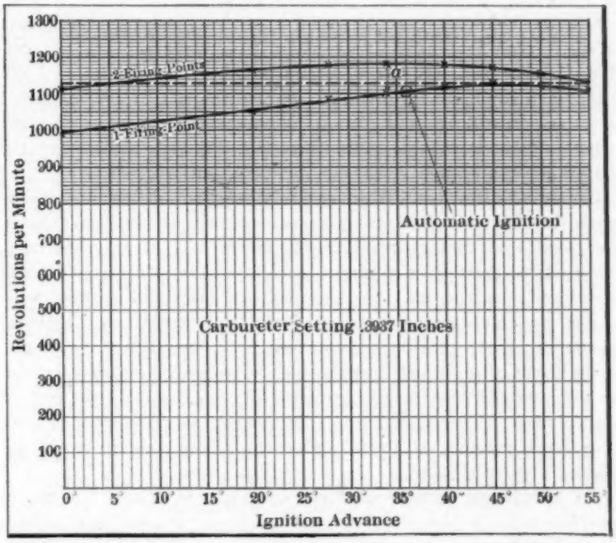


Fig. 4—Curves with a carbureter setting of .3027 inch.

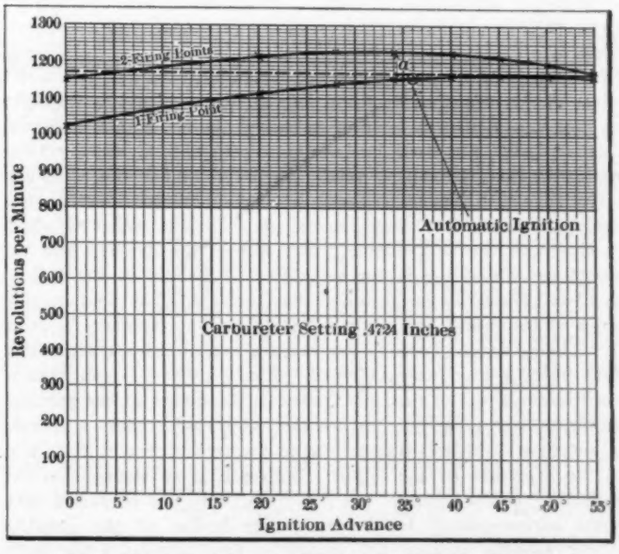


Fig. 5—Curves with a carbureter setting of .4724 inch.

90 revolutions per minute. The effect of the second spark on the output of the motor is extraordinary, as the engine speed immediately increases regardless of the setting, and in some cases as much as 120 revolutions per minute. In the opposite way when the second spark is cut off a noticeable diminution of the number of revolutions takes place. The relation of the curves in the vicinity of the dead center gives the result that with the double spark set at dead center the same output is attained as with one spark alone at the most propitious setting of advance, and that by simply switching on the second spark with full retard the same result is obtained as with full advance of the one spark.

It is possible therefore to obtain all the advantages of the retard by electrical connections alone, dispensing with the advance mechanism obtained through mechanical means. The number of revolutions obtained with the automatically advanced ignition can be seen in Figs. 2 to 5. Owing to the fact that the range of advance of this apparatus, on account of the ratio of 1:1.5 between motor and apparatus axis, does not extend far enough, it was not possible to give it more advance than 36 degrees. On this account the number of revolutions of this instrument with automatic advance is lower than the maximum number of revolutions that could be obtained with a single spark. Naturally the revolutions can be obtained when a greater setting is provided for.

It need hardly be pointed out that these propitious results from the double-spark apparatus can only be obtained when the spark points are placed as far apart as possible.

To summarize, therefore, it is clear that by firing the gases simultaneously in two points in the explosion chamber it is possible to obtain the same result with the double sparks set at or about dead center as it is possible to obtain with the one spark at full advance, and when the double spark is advanced the power is increased from 4 to 5 per cent.

Culled From the Consuls' Reports

Italy is already exerting herself and getting her house in order for the International Exposition which is slated to open in Rome in May. One of the Government's recent accomplishments is the opening of a new public automobile line, seventy-five miles in length, the longest in Italy, the route extending from Bologna to Sampiero a Sieve. After the completion of other lines now in course of construction, Itally will stand at the head of all the European countries in the matter of public automobile service, for her public lines will then measure 3,500 miles.

Prince Edward Island, which has been under the ban in the past, so far as the running of automobiles on the public roads is concerned, bids fair to come out into the light of modern divertisement. It is likely that the present prohibitory law will be repealed and that motor vehicles will be allowed to run by the opening of Spring.

Tropical Cuba provides some ideal automobile roads. This is particularly the case in the vicinity of Matanzas and throughout the Yumuri Valley. The island abounds in fascinating landscapes and quaint towns through whose streets it is a pleasure to ride and observe the ancient customs of the people. Cardenas, fifty miles east of Matanzas, is one of the cities included in the itinerary of automobilists who desire to possess a thorough knowledge of the island; likewise, Cienfuegos, "The Pearl of the South," as this charming city is called. Santa Clara and Santiago de Cuba offer fine views after the tourist shall have passed through some of the wildest and grandest scenery in this Winter paradise.

In Yokohama, Japan, a company has been organized for the purpose of manufacturing, importing, dealing in, repairing and renting automobiles and parts. The promoters constitute a joint stock company, with $100,000 as a working capital. Up to the present time the concern has not contemplated the making of automobile tires.

From Brazil comes another voice to the end that if American manufacturers of automobiles hope to get a footing in the country, especially in the districts of Acre and Madeira River, it behoves them to make a quick start and send the right sort of men to handle the business. There are other conditions that it would be necessary to provide for. One is the establishment of repair shops. There are none in this section of the country. Besides, communication by steamer is very limited—in some localities to two or three boats a year. It will, therefore, be seen that the necessity of making provision for parts to supplant the parts as they wear out is vital.

Digest

EXTRACTS FROM CONTINENTAL JOURNALS ON SUBJECTS ALLIED TO AUTOMOBILE ENGINEERING: NEW RUBBER COMPOUND; DESCRIPTION OF NEW LIGHT-WEIGHT AVIATION MOTOR; AUTOMATIC DYNAMOELECTRIC COUPLING FOR GASOLINE CARS

New Rubber Compound—A member of a tire company in London has been conducting experiments with the view to producing a rubber compound, composed of pure rubber and a vegetable substance which, he hopes, may result in producing good tires and at the same time get rid of the defects which he considers are due to the present method of incorporating mineral substances, such as chalk, oxide of zinc, and magnesia with the rubber. The inventor claims to have developed a process by which the vegetable fibre is made to pass through the rubber in all directions in very small threads. The rubber and the fibre are thus made to act in mutual support, forming a tough, resistant tire, although it is apparent that the combination would be effective only in the case of solid tires.

In fan-shaped aviation motors much of the weight-saving is effected legitimately by the great shortening of the crankshaft and its casing, and as it is designed to be cooled sufficiently simply by the air currents it meets or creates by its forward movement in space and not by any rotation of its own, its development is also from this point of view of interest to automobile constructors, being one promising possible application to light vehicles and attractive by its fore-and-aft compactness—perhaps especially for utility wagons. One of the most advanced motors of this type is the REP, of which a vertical cut through the crankshaft is shown in one of the accompanying illustrations. The five cylinders, each 110 by 160 mm., work in parallel planes on two crankpins 180° apart. The cylinder heads are hemispherical and the valves in the cylinder heads are all worked from a single grooved cam disk provided with two bosses and geared internally to rotate at one-fourth the speed of the crankshaft. The force-feed oiling is worked by an eccentric and sends the lubricant to the two crankshaft bearings through the hollow of the shaft. The carbureter is located at the bottom of the oil tank, to protect it against sudden changes of temperature, and the same control operates on the fuel as on the additional air intake. The motor is started by spark from a storage battery, but the ignition is continued by magneto. Its weight is 150 kilograms and the torque at 1,160 revolutions per minute is 38 kilograms, corresponding to 61.8 horsepower. In the illustration the letters of reference designate as follows: A induction valve, B carbureter jet chamber, C rocker arm, 4 admission piping, E exhaust valve, F rear extremity of crankshaft, G reservoir for hot oil, H air intake for carbureter, I distributer to intake pipes, J oil pump, K distribution cam disk, L armature shaft of the magneto, M valve-controlling gear pinion, N engagement groove in cam disk, P magneto, Q air vent, S tappet, W rod from eccentric actuating the oil pump.

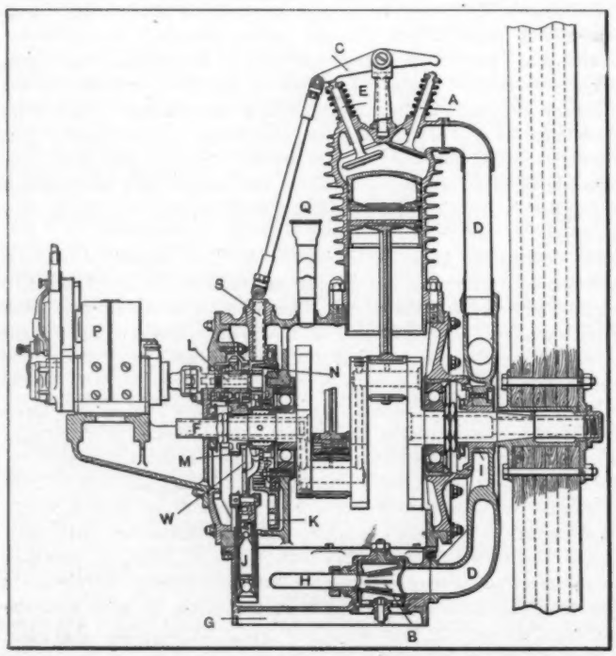


Fig. 1—Light-weight, fan-shaped REP aviation motor

Vector calculus, as a rule entirely neglected by engineers, much simplifies calculations in mechanics and mathematical physics and permits an almost intuitional at any event not very abstruse, study of the numerous modern problems in hydrodynamics, elasticity and electrodynamics. Applied to analytical geometry it brings its algebraic formulas back to the aspects of synthetic geometry. New means for entering upon this study is offered in the form of a French translation. *Eléments de calcul vectoriel* of the authoritative Italian original by G. Burati-Forti and R Marcolongo. The translation, 229 pages, is published by the Librairie Hermann, of Paris, and costs 8 francs.—Review in *Le Génie Civil.*

An automatic dynamoelectric coupling intended for automobiles taking the driving power from a gasoline motor through a dynamo and electric motor equipment has been developed by the Persche Company, of Wiener Neustadt, and serves to give the automobile a speed commensurate with changes of road surface, load or grade, while preventing the maximum capacity of the motors, both gasoline and electric, from being exceeded. The armature Ad is connected with the gasoline motor shaft W by means of a strong helical spring F and is arranged so that it can turn in relation to this shaft, but cannot be dislocated axially. On shaft W is mounted a sleeve C which rotates with the shaft, but can be axially displaced, and at the front end this sleeve is threaded to match a corresponding thread upon a prolongation of the dynamo armature Ad. The spider G which carries both the field magnet poles Md of the dynamo and the armature Am of the motor is splined to the driven shaft E so as to be capable of longitudinal displacement. The field magnet poles of the motor are secured fixedly to the stationary housing D. The surfaces of the two armatures and of the corresponding field poles are conically formed. The manner of operation is the following: The spring F transmits the power of the gasoline motor to the dynamo armature Ad, in whose wiring a current is generated which is transmitted to the two magnetic fields and to the armature of the motor. Spring F is so strong that the resistance at the rims of the driving wheels can be raised to a point corresponding to the maximum power of the gasoline motor without causing the spring to yield (so says the text; it will appear from the following, however, that the spring does not possess this miraculous property, but that its normal position corresponds in tension to the maximum permissible traction resistance of the vehicle); that is, without causing the dynamo armature to lag in relation to the shaft W. When now the resistance is increased, as on a rising gradient, the current absorbed by the motor armature grows in volume and calls for increased torque from the gasoline motor. But, by this increased demand, spring F yields, so that armature Ad lags behind sleeve C. This results in displacing sleeve C axially, by means of the threaded connection with the hub of the dynamo

armature, and thereby the spider G, with the motor armature Am and the magnets Md of the dynamo, is pushed in the same direction. By this movement and the conical formation of the parts, the air space d, between the dynamo armature and the opposite magnets, is widened, while the air space d_2, between the motor armature and the motor magnets secured to the housing D, is reduced. By the reduction of d_2 the number of revolutions of the motor armature and, consequently, the vehicle speed is reduced, and the increase of current volume, due to the increase of load, is automatically nullified. The dynamo field becomes smaller by the widening of d_1, and thereby the torque required for a given volume of current is reduced. The spider G will consequently under all circumstances of traction resistance be displaced only so far that the current in the motor armature will continue to correspond to the reduced field of the dynamo armature and to the traction effort transmitted through the dynamo magnets. On the other hand, if traction resistance is reduced at the vehicle wheels, spring F will throw off its burden by forcing the dynamo armature to rotate at a certain angle in advance of shaft W, by which action spider G advances upon the threaded hub of Ad, and the spaces d_1 and d_2 are respectively reduced and enlarged, so as to raise the speed of the motor armature Am and thereby the speed of the vehicle.—From series of articles on innovations in electric vehicles by Wilhelm Wolf in *Der Motorwagen*.

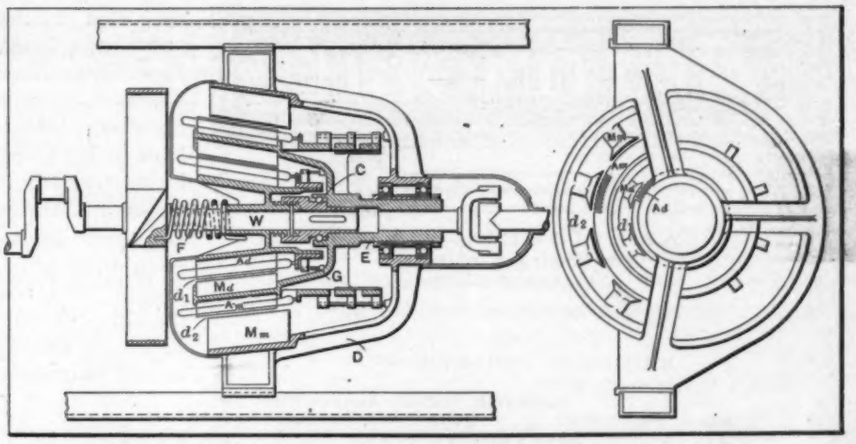


Fig. 2—Self-compensating electric transmission for gasoline vehicles

France Still Holds a Notable Place in the World's Development of the Automobile Industry.—The number of machines produced in 1899, namely, 1,438, had increased to 25,269 in December, 1909, when the last report was published. During the same period the increase of transport and public automobiles was from 234 to 19,500. During 1907, 1908 and 1909 there was an increase of 13,483 vehicles, representing 232,260 horsepower, against 130,000 horsepower of 9,155 vehicles for the years of 1904, 1905 and 1906. There were 44,769 machines produced in 1909, whose selling price aggregated $92,640,000. During 1899 France exported automobiles to the value of $821,987, while in 1909 the sum of $28,296,695 was given as the value of machines exported. During 1899 France imported $91,289 worth of automobiles, and $1,452,325 worth in 1909. The exports for 10 years amounted to $161,771,670, while the imports were $8,397,044. For the first six months of 1910 there was an excess of $15,406,418 over the imports. There were about 60,000 automobiles registered in France in 1910 as compared with 44,759 in 1908. Paris has 10,045 registered automobiles. There are 13 registered machines in the Island of Corsica.

Coming Events

CALENDAR OF FUTURE HAPPENINGS IN THE AUTOMOBILE WORLD THAT WILL HELP THE READER KEEP HIS DATES STRAIGHT—SHOWS, ANNUAL MEETINGS AND OTHER FIXTURES

Jan. 14-28.....Philadelphia, Annual Show, Philadelphia Licensed Automobile Dealers' Association, First and Third Regiment Armories.
Jan. 16-21.....New York City, Madison Square Garden, Eleventh Annual Show, Commercial Division, A.L.A.M.
Jan. 16-21.....Detroit, Mich., Tenth Annual Show, Detroit Automobile Dealers' Association, Wayne Pavilion.
Jan. 14-20.....Milwaukee, Wis., Annual Show, Milwaukee Automobile Dealers' Association, Auditorium.
Jan. 25-28.....St. Paul, Minn., Annual Show, Automobile Dealers' Association of St. Paul, Auditorium.
Jan. 28-Feb. 4...Chicago Coliseum, Tenth Annual National Automobile Show Under the Auspices of the National Association of Automobile Manufacturers, Inc., Pleasure Cars and Accessories, Exclusively.
Jan. 30-Feb. 4...Troy, N. Y., Annual Show, Troy Automobile Club, State Armory.
Feb. 6-11.....Chicago Coliseum, Tenth National Automobile Show Under the Auspices of the National Association of Automobile Manufacturers, Inc., Commercial Vehicles, Pleasure Cars, Motorcycles and Accessories.
Feb. 6-12.....Buffalo, N. Y., Ninth Annual Show, Automobile Trade Association of Buffalo, Broadway Arsenal.
Feb. 9-12.....Davenport, Iowa, Second Annual Show, Davenport Automobile Club.
Feb. 13-18.....Washington, D. C., Annual Show, Convention Hall.
Feb. 13-18.....St. Louis, Mo., Fifth Annual Show, Coliseum.
Feb. 13-18.....Winnipeg, Man., First Annual Show, Winnipeg Motor Trades Association.
Feb. 13-19.....Kansas City, Mo., Annual Show, Motor Car Trade Association.
Feb. 14-19.....Dayton, O., Second Annual Show, Memorial Building.
Feb. 15-18.....Grand Rapids, Mich., Annual Show.
Feb. 18-25.....Minneapolis, Minn., Annual Show, Minneapolis Automobile Show Association, National Guard Armory.
Feb. 18-25.....Brooklyn, N. Y., Annual Show, Brooklyn Motor Vehicle Dealers' Association, 23d Regt. Armory.
Feb. 18-25.....Binghamton, N. Y., Second Annual Show, Binghamton Automobile Club and Chamber of Commerce, State Armory.
Feb. 18-25.....Newark, N. J., Fourth Annual Show, New Jersey Automobile Exhibition Co.
Feb. 20-25.....Cincinnati, O., Annual Show, Cincinnati Automobile Dealers' Association.
Feb. 20-25.....Portland, Me., Sixth Annual Show, Auditorium.
Feb. 20-26.....Omaha, Neb., Annual Show, Omaha Automobile Association.
Feb. 21-25.....Baltimore, Md., Annual Show, Automobile Club of Maryland, Fifth Regiment Armory.
Feb. 22.....Cleveland, O., Annual Show, Cleveland Automobile Show Company.
Feb. 24-27.....New Orleans, La., Annual Show, New Orleans Automobile Club.
Feb. 25-Mar. 4...Toronto, Ont., Automobile Show, Ontario Motor League.
Feb. 25-Mar. 4...Kansas City, Mo., Fifth Annual Show, Kansas City Automobile Dealers' Association, Convention Hall.
Mar. 4-11.....Boston, Mechanics' Building, Ninth Anual Show, Licensed Automobile Dealers' Association.
Mar. 7-11.....Des Moines, Ia., Third Annual Show, Des Moines Automobile Dealers' Association, Coliseum.
Mar. 14-18.....Syracuse, N. Y., Third Annual Show, Syracuse Automobile Dealers' Association, State Armory.
Mar. 14-18.....Denver, Col., Annual Automobile Show, Management Motor Field, Colorado Auditorium.
Mar. 15-18.....Louisville, Ky., Annual Show, Louisville Automobile Dealers' Association, First Regiment Armory.
Mar. 18-25.....Pittsburg, Annual Show, Pittsburg Auto Show Association (Inc.), Exposition Hall.
Mar. 25-Apr. 1...Buffalo, N. Y., Fourth Power Boat and Sportsmen's Show, Sixty-fifth Regiment Arsenal, Buffalo Launch Club.
Mar. 25-Apr. 8...Pittsburg, Fifth Annual Show, Duquesne Garden, First Week, Pleasure Cars; Second Week, Commercial Trucks. Automobile Dealers' Association of Pittsburg, Inc.
Apr. 1-8.....Montreal, Can., Automobile and Motor Boat Show. Automobile and Aero Club of Canada.

THE AUTOMOBILE

Vol. XXIV Thursday, January 19, 1911 No. 3

THE CLASS JOURNAL COMPANY
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231-241 West 39th Street, New York City

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SUBSCRIPTION RATES
United States and Mexico - - - - - - - - - - - - - - - One Year, $3.00
Other Countries in Postal Union, including Canada - - - - One Year, 5.00
To Subscribers—Do not send money by ordinary mail. Remit by Draft, Post-Office or Express Money Order, or Register your letter.

FOREIGN SUBSCRIPTION AGENTS
ENGLAND:—W. H. Smith & Sons, Ltd., 186 Strand, London, W. C., and all bookstalls and agencies in Great Britain; also in Paris at 248 Rue de Rivoli.
FRANCE:—L. Baudry de Saunier, offices of "Omnia," 20 Rue Duret, Avenue de la Grande Armee, Paris.
GERMANY:—A. Seydel, Mohrenstrasse 9, Berlin.

Entered at New York, N. Y., as second-class matter.
The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile magazine (monthly), July, 1907.

FREIGHT automobiles are the center of attraction at the Garden in New York this week, and while it is true that the attendance is more sparse than it was when passenger automobiles were being displayed, the fact remains that it represents the class of men who have goods to deliver, and they want to know how to increase the efficiency of their establishments. There is too much talk, however, on a basis of the comparison of the newer method with the old. It is a great mistake to overlook the fact that it costs money to deliver goods from a department store to a warehouse in the suburbs, and to handle them twice over; moreover, customers become dissatisfied on an increasing basis for every minute that the goods lie in the supplementary warehouse. Incidentally, the cost of this warehouse and the value of the real estate, in addition to the overhead charges, must all go against the horse. Were automobiles used exclusively in delivery work, there would be no occasion for this double handling of goods; and the extra expense involved, coupled with the dissatisfaction that must arise, argues in favor of the use of freight automobiles.

* * *

REGARDING the attitude of those who are interested in freight automobiles, it remains to be said that some of the views expressed will have to be revamped before they can be accepted on a basis of finality. It seems to be the common idea among a certain class of men that the horse-drawn vehicle is good enough for short-haul work, and that freight automobiles should be designed along racing lines to satisfy the long-haul situation. It is obvious rot to assume for a moment that an automobile, if it is self-evidently superior for long-haul work, is deficient in some particular if the distance is shortened up. It is like saying that it would not be possible to travel 100 miles per day, for illustration, on a one-mile track, and that the only way left for the covering of a great distance is to have a road of a great length. The trouble with the whole situation is due to the color of the glasses through which the critic looks. If he has the odor of the stable upon him, he is bound to use horse-talk.

* * *

REFERRING to the questions of racing speed for freight automobiles, there are so many points to be made against the undue rate of traveling that seems to be in brisk demand that a considerable amount of space would have to be devoted to this question before its important phases would be exhausted. Briefly put, it spells absolute ruin to run freight automobiles at high speeds. A car that should do good service for ten years, with a minimum of the cost of maintenance, may be worn out in considerably less time if it is speeded up sufficiently; but even if the structure does hold together, the cost of maintenance, due to the maluse of tires, and in other ways, will be far beyond the necessities. There still remain the chances of accidents if drivers are given instruments of destruction and they are sent out unrestrained; it is not too much to expect that there will be a certain percentage of hazard, and here and there an accident that should be avoided under the ordinary course, it being within the bounds of prudence from every point of view to run freight automobiles at freight automobile speeds.

* * *

THOSE who contemplate investing their good money in the automobile business, now that the Selden Patent does not threaten their freedom of action, will find it entirely to their advantage to look before they leap. Probably nine-tenths of all the stories that have been told about the enormous profits to be derived from the building of automobiles were the veriest fairy tales emanating from such high sources that no living man has ever been able to trace their responsibility. It seems too bad to have to inflict the old dictum upon those who scan the pages of THE AUTOMOBILE, but they are reminded of the fact that "one swallow does not make a summer"; in other words, the "accidents" that have happened in the financing of automobiles which brought an undue amount of "paper money" to the fore, did not bring ultimate success to the men who have stayed in the business, shouldered the responsibility and stood the brunt of the fight. It still remains for the builders of automobiles to justify their investment and this they can do only by building good automobiles year in and year out, charging a fair price for them, with never a thought of more than an equitable return. The idea that a good automobile can be whittled out by a jacknife in the hands of a lounger around a country store has the makings of a fine novel in it, but when this idea is put into practice the instrument aforesaid becomes as dull of edge as the wit of the man who undertakes the task.

News Section

HAPPENINGS OF THE WEEK IN VARIOUS PARTS OF THE COUNTRY AS GATHERED BY THE 84 SPECIAL WRITERS AND CORRESPONDENTS OF "THE AUTOMOBILE"

Coffin Elected President of the Manufacturers' Contest Association—Many Organizations Allied with Automobile Trade and Sport Hold Annual Meetings and Banquets—Preparations Completed for the National Show at Chicago—News of Interest to Makers and Dealers Throughout the Country—Brief Items of All Sorts

Howard E. Coffin Elected President of M. C. A.

COMPETITIONS, this year, will have to be regulated more efficaciously than they were in the past if it is to be the idea to maintain the integrity of racing, and the situation was discussed at great length at the annual meeting of the Manufacturers' Contest Association, which was held January 13, in the Board Room of the A. L. A. M., New York City. The main business was the election of officers for the ensuing year, and the result of the election was that Howard E. Coffin, past president of the Society of Automobile Engineers, and vice-president of the Hudson Motor Car Company, was elected to the presidency of the association. Benjamin Briscoe, the retiring president of the association, owing to press of affairs, gave way to Mr. Coffin. Howard Marmon, of the Nordyke & Marmon Company, Indianapolis, Ind., was elected to the vice-presidency and chairman of the general rules committee; E. R. Hollander was made secretary-treasurer; Russell A. Field was re-elected assistant treasurer. The directory will be ably filled by the officials as named: C. E. Emise, Lozier Motor Company, and W. H. Vandervoort, Moline Automobile Company, were elected to the board.

About forty of the makers of automobiles are members of the Manufacturers' Contest Association, and it is the aim of the association to maintain a high standard for contests. During last year the association was a power for good. There were nine additions to the ranks of the association during 1910.

It is more than likely that there will be some important changes in the methods of the association for this year. One point is represented in the idea of a Board of Review in contest matters, along lines looking to such powers of the board that it will be in the nature of a court of last resort. It is the idea to appoint men of standing and experience on this board, but in order to prevent the frivolous reference of protests to the board, it is proposed to exact a fee of $1,000 from the contestant who desires to appeal.

A considerable number of changes were discussed and agreed upon by the association, most of them being of a minor character, and when the rules of the association are edited by the Contest Board, it is more than likely that they will appear in much more satisfactory shape than they were last year. Chairman S. M. Butler will have his hands full during the next few days preparing the new rules for presentation to the industry and the public. The next meeting of the Manufacturers' Contest Association will be held in Chicago during the holding of the National Automobile Show, which will open January 28, closing on February 11.

H. T. Dunn Heads M. & A. M.

On the morning of January 14, at 10:30 o'clock, at the Motor and Accessory Manufacturers' rooms, the following officers were elected to serve for the ensuing year: President, H. T. Dunn, of The Fisk Rubber Company. First Vice-President, C. T. Byrne, of Byrne, Kingston & Company. Second Vice-President, C. E. Whitney, of the Whitney Manufacturing Company. Third Vice-President, C. L. Barnes, of the Billings & Spencer Company. Treasurer, W. S. Gorton, of the Standard Welding Company. Secretary, L. M. Wainwright, of the Diamond Chain & Manufacturing Company. Wm. M. Sweet was re-engaged as manager of the association.

Colonels to Keep Money at Home

LOUISVILLE, KY., Jan. 16—Plans are now on foot for the enlargement of the Kentucky State Automobile body. It has been proposed to make it an association with individual members, who will give a small amount each year to its work and to enlist the sympathy and aid of every autoist in the State in this manner. An association with 3,000 members each paying $1 to the work is a plan likely to be realized in the near future and the officers of the association are working hard at the present time on that line. In all probability there will be a call for a meeting next week of the Louisville Club in conjunction with the State organization, and it is likely that the State Association will be launched on different lines and with a definite purpose in view to get every automobile owner in the State on its books and to maintain an office and direct the disbursement of a goodly sum of money each year for the interest of Kentucky autos. Good roads, good laws and other important matters will be in the line of its work.

Tire Prices Cut Ten Per Cent.

As predicted in the columns of THE AUTOMOBILE, another slash in tire prices has been announced. The reduction this time is ten per cent. and is effective at once. As the price of crude rubber is still trending downward with a rather weak, dull market, the chances are that another dig at prices will be taken before the Spring demand for tires is felt.

Tire manufacturers state that a permanent level of $1.20 a pound is in sight, and that tire prices will respond to that influence.

Real Southern Road Information

So much has been recently written about Southern road conditions by roll-top motorists and so many inquiries for accurate information have come to the Official Automobile Blue Book that its editor, Henry MacNair, recently made a tour of exploration through the Southern States, going as far as Florida. Mr. MacNair, who has just returned, assures users of the 1911 Blue Book that they will find therein some valuable information about roads, hotels, garages and points of interest in that section.

Smoke Pipe of Peace at A. L. A. M. Banquet

COMING on the heels of the decision of the Selden patent cases, the annual banquet of the A. L. A. M. Thursday evening at the Hotel Astor proved to be an enthusiastic and exceedingly pleasant function despite the tenor of the court's opinion.

Over 250 members of the association, guests and the press were present, and the amicable relations embracing the whole trade were emphasized by the attendance of Henry Ford, president of the Ford Motor Company, and several officials of that corporation as guests of honor of the association.

The pipe of peace was smoked literally and figuratively by Col. Charles Clifton, president of the A. L. A. M., and Mr. Ford while the banqueters cheered.

Col. Clifton referred to the unification of the industry as the result of the litigation, and, after a few well-turned remarks, lighted a long pipe, gravely drawing a whiff or two of the smoke.

Then turning to Mr. Ford he silently passed the pipe. The victor in the long-drawn-out litigation accepted it readily and drew in the blue smoke, passing it back to the head of the A. L. A. M.

Of course, no formal truce was drawn up, but the action was so dramatic and characteristic that all those present were given the impression that the legal war was over.

The menu enjoyed was as follows:

Huitre de Cape Cod en Cocktail.
Tortue Verte Claire à la Fine.
Champagne.
Olives. Celeri. Radis. Amandes Salées
Supreme de Bar Raye, Joinville.
Pommes de Terre en Croquettes.
Tournedos de Filet de Bœuf, Richelieu.
Tomatoes Farcies. Haricots Panaches
Coquille de Volaille à la Regence.
Sorbet au Rhum.
Canard Ruddy Roti, Gelée d'Airelles.
Salade Riche.
Glace Duchesse.
Petits Fours. Fruits Assortis.
Fromage.
Café Noir.
Haut Sauterne, 1905.
G. H. Mumm & Co.'s Extra Dry.
G. H. Mumm & Co.'s Selected Brut.
Liqueurs. Perfection Scotch Whisky. Apollinaris.
Philip Morris Cigarettes. Cigars.

Frank R. Lawrence was toastmaster, and the chief speakers of the evening were J. Benton Crisp, who replied for Mr. Ford, outlining the course of the recently concluded litigation. Secretary of State Edward Lazansky made an address on the New York automobile law.

Mr. Lazansky's speech commanded the closest attention. He said that the present law was imperfect in a number of particulars, especially in that it does not provide for examination of automobile owners. He said that he did not believe that the chauffeur should be taxed simply because he was a chauffeur and that the expense to this class of workmen should only be so much as is necessary to pay for badges. He called attention to the fact that the examination of chauffeurs is entirely inadequate and that a truly efficient board of examiners is the main requisite.

James Schermerhorn and Henry M. Duncan made strong and happy speeches.

The list of those in attendance was as follows, not including the Ford party, which comprised Mr. Ford, James Couzens, Gaston Plaintiff and Mr. Crisp:

W. W. Austin, P. T. Barbor, H. F. Ball, Wm. C. Barry, Jr., A. G. Batchelder, J. W. Bate, B. A. Becker, David Beecroft, C. A. Benjamin, Geo. W. Bennet, Herbert Berri, Leigh L. Best, Samuel R. Betts, F. O. Bezner, H. A. Bonnell, Edward S. Bowman, Frank S. Brant, C. S. Briggs, Benjamin Briscoe, E. H. Broadwell, Chas. M. Brown, Geo. H. Brown, W. H. Brown, M. J. Budlong, Frank K. Bull, H. P. Burchell, S. M. Butler, James M. Carples, Hugh Chalmers, F. C. Chandler, R. D. Chapin, Julian Chase, C. W. Churchill, Kenneth Clark, John S. Clarke, Coker F. Clarkson, Chas. Clifton, H. E. Coffin, F. Colver, M. Worth Colwell, Lee Counselman, J. G. Cowling, G. A. Crane, H. F. Cuntz, Geo. E. Daniels, F. E. Dayton, G. S. Delany, Horace DeLisser, F. S. Dickenson, Geo. M. Dickson, G. P. Dorris, Frank Dorman, M. L. Downs, Henry M. Duncan, Geo. W. Dunham, H. T. Dunn, W. C. Durant, Chas. E. Duryea, J. F. Duryea, Hayden Eames, J. B. Eccleston, Fred H. Elliott, C. A. Emise, C. J. Farney, Thos. J. Fay, David Fergusson, R. J. Finnegan, H. G. Fisk, E. A. Fitts, H. W. Ford, W. J. Foss, Geo. G. Foster, J. B. Foster, H. H. Franklin, Louis H. Freedman, J. D. Fulton, R. D. Garden, A. L. Garford, E. L. Gilchrist, J. W. Gilson, E. J. Gittins, Chas. Glover, H. A. Goddard, Geo. C. Gordon, Morris Grabowsky, C. E. Hadley, C. C. Hanch, J. I. Handley, L. P. Hardy, M. S. Hart, Elwood Haynes, F. J. Haynes, Thos. Henderson, E. R. Hewitt, S. E. Hibben, F. M. Hoblitt, Robert P. Hooper, Wm. Horner, Guy Hutchinson, R. B. Jackson, Warner H. Jenkins, Jr., W. W. Jennings, R. B. Johnston, R. H. Johnston, Henry B. Joy, James Joyce, Geo. E. Keller, J. C. Kerrison, Isaac Kinsey, G. A. Kissel, L. H. Kittredge, Wm. W. Knowles, Edward F. Korbel, H. B. Krenning, H. B. Lasher, Frank R. Lawrence, Edward Lazansky, N. Lazarnick, W. C. Leland, Wm. Mitchell Lewis, W. H. Linden, Herbert Lloyd, V. A. Longaker, G. J. Loomis, Harry A. Lozier, David S. Ludium, W. H. McIntyre, James F. McNally, Alvan Macauley, J. W. Maguire, C. F. Marden, H. C. Marmon, Chas. H. Martin, J. S. Marvin, F. F. Matheson, G. A. Matthews, Henry May, A. N. Mayo, W. S. M. Mead, Chas. W. Mears, C. J. Meegan, D. S. Menasco, S. W. Merrihew, Wm. E. Metzger, Samuel A. Miles, F. L. Mitchell, H. G. Mitchell, R. H. Montgomery, C. J. Moore, R. L. Morgan, W. J. Morgan, W. G. Morse, E. B. Moss, Geo. R. Neil, C. A. Neracher, Arthur C. Newby, Millard H. Newton, F. Lee Norton, H. W. Nuckols, Thos. C. O'Connor, R. E. Olds, Ralph Owen, R. M. Owen, W. W. Owen, Carl H. Page, I. H. Page, Victor W. Page, Jean Paleologue, R. A. Palmer, J. Patterson, J. G. Perrin, Albert L. Pope, Arthur W. Pope, Chas. S. Pope, Geo. Pope, Harold L. Pope, Finley R. Porter, J. D. Porter, C. F. Redden, W. A. Redding, Herbert Reed, Alfred Reeves, S. Regar, W. M. Remington, Robt. C. Reuschaw, Howard Reynolds, C. W. Richards, A. L. Riker, A. W. Robinson, F. W. Roche, J. Edward Roe, H. P. Rolfe, E. H. Rounds, E. F. Russell, J. E. G. Ryan, R. H. Salmons, A. E. Schaefer, C. E. T. Scharps, A. R. Scharton, Pierce D. Schenck, James Schermerhorn, E. E. Schwarzkopf, H. U. Sharp, W. C. Shepherd, Guy Shields, H. E. Shiland, H. O. Smith, W. H. Son, T. H. Spence, F. Ed. Spooner, F. B. Stearns, J. G. Sterling, Geo. Stevens, Harry M. Stevens, G. H. Stilwell, C. G. Stoddard, Geo. L. Sullivan, J. T. Sullivan, M. J. Sullivan, Moyer Swaab, William M. Sweet, E. R. Thomas, Thomas H. Thomas, Geo. T. Thompson, Walter Tisne, Carl Tucker, Harry Unwin, C. H. Van Dervoort, W. H. Van Dervoort, R. B. Van Dyke, Fred. J. Wagner, G. A. Wahlgreen, S. D. Waldon, Chas. E. Walker, Wilbur C. Walker, A. F. Way, J. W. Wellington, John C. Wetmore, H. E. Whitcomb, Walter C. White, Wm. T. White, Windsor T. White, P. A. Williams, Jr., J. N. Willys, C. A. Woolson, Leonard Wooster, Roy F. York, James C. Young, George M. Basford, C. H. Gillette, C. L. Holden, Charles Lewis, Charles R. Stevenson, H. G. Strong, C. C. Winningham.

M. & A. M. Holds Third Annual Banquet

ONE of the most important and happy events of the year took form in the third annual banquet of the M. & A. M., which was held in the grand ballroom of the Waldorf-Astoria during the evening of January 14, as the fitting culmination of a week of unusual activities in automobiledom. The attendance at the banquet was not only large, but the representative of nearly every accessory maker of note was present; speakers of great prominence entertained the guests and members, and the guests included the most prominent of the industry, numbering among them leaders in the manufacture of automobiles. The meeting was presided over by H. E. Raymond, the retiring president of the association, and Col. Charles Clifton, president of the A. L. A. M., occupied the seat of honor at the right of the presiding official. Joseph L. Barbour acted as toastmaster and he delighted his hearers by the piquancy of his witticisms. After a short address by President Raymond, the toastmaster introduced Col. Charles Clifton, whose address on this occasion was unusually brilliant, and among other things he pointed out that the young men of the industry must take up the burden and carry on the good work vigilantly and untiringly; moreover, it

Banquet of Society of Automobile Engineers at A. C. A. Club House, January 11

Banquet of Association Licensed Automobile Manufacturers at Hotel Astor, January 12

Banquet of Motor and Accessory Manufacturers at Waldorf-Astoria, January 14

was the consensus of opinion of those present that Col. Clifton's remarks about efficiency were apropos when he said: "Take efficiency home with you." It was pointed out that there were quite a number of other enterprises into which efficiency should enter.

Dr. E. R. L. Gould, ex-City Chamberlain, presented a learned address, talking about the automobile from the point of view of the man who has yet to be introduced, and Clarence Harvey, poet and playwright, rung in a quantity of rhyme that threw merriment into high gear. When toastmaster Barbour introduced Lawyer Edward W. S. Johnston, he pointed out that Lawyer Johnston was a man of high standing in the profession (about 6 ft. 3 inches), and the keen and vigorous way in which he handled the automobile subject bore out the contention of the toastmaser to the last degree. Col. George Pope was called upon to respond to the compliment which was paid to him in view of his most efficient work as chairman of the A. L. A. M. show committee, and in his customary happy way he made a brief response. Secretary Sweet, of the M. & A. M., had an opportunity to exercise his rare executive ability, and his work was so entirely well done that toastmaster Barbour complimented the assemblage upon having the benefit of his work and his presence. President Raymond made the closing address, thanking his confréres for their support and co-operation; he said that the work which he was called upon to do was in the nature of crystallizing previous efforts, and that in his opinion his successor would have to bear the brunt of a large undertaking, but that he would have the support of the most enthusiastic organization of which he had knowledge.

Among the guests were the Hon. Frank C. Laughlin, Col. George Pope, chairman A. L. A. M. show committee; Merle L. Downs, secretary A. L. A. M. show committee; Alfred Reeves, general manager A. L. A. M.; Coker F. Clarkson, secretary and general manager of S. of A. E.; Samuel A. Miles, general manager of the N. A. A. M.; Chester I. Campbell, manager Boston Show and Robert W. Barbour. Messrs. Sidney S. Meyers, counsel M. & A. M., and T. E. A. Barthel were also present.

ACCESSORY MAKERS REPRESENTED AT THE BANQUET

The Fisk Rubber Co.—H. G. McGaw, H. T. Dunn, A. N. Mayo, L. Bennett, W. P. Kearney, Claude Platt, G. A. Ludington, J. C. Cole, J. B. Cothran, F. H. Ayres, H. G. Fisk, Wm. E. Hyslop.
American Ball-Bearing Co.—W. C. Baker, F. H. Teagle.
The Goodyear Tire and Rubber Co.—W. T. Teagan, Chas. Measure, A. F. Osterloh, E. F. Jackson, G. M. Stadelman, W. D. Shilts, Ralph Dowse, J. B. Haus, F. G. Van Bever.
Phineas Jones & Co.—Henry P. Jones, H. Percy Jones.
Isaac G. Johnson & Co.—M. F. Doty.
The Hess-Bright Mfg. Co.—Henry Hess.
Adam Cook's Sons.—Geo. Baum.
The New Process Rawhide Co.—T. G. Meachem, W. H. Diefendorf, J. F. S. Meachem.
Strieby & Foote Co.—K. L. Ryman.
The Veeder Mfg. Co.—C. H. Veeder, E. B. Smith, H. W. Lester, D. J. Post.
Brown-Lipe Gear Co.—H. W. Chapin, L. D. Bolton, K. F. Peterson, D. M. Coffman, P. J. Dasey, T. J. Wetzel, M. C. Warwick.
Muncie Wheel Co.—O. B. Bannister, H. B. Bannister.
Dover Stamping and Mfg. Co.—W. H. Dunning.
Warner Gear Co.—C. E. Davis, R. P. Johnson.
Hodgman Rubber Co.—G. B. Hodgman, S. T. Hodgman, A. W. Warren.
Lovell-McConnell Mfg. Co.—F. H. Lovell, D. A. McConnell, W. O. Turner, J. E. Millen.
Newark Rivet Works.—N. E. Smith, R. H. Trimpi.
The Hartford Rubber Works Co.—J. D. Anderson, E. S. Benson, E. S. Roe, Chase Langmaid, W. T. Powell.
The Willard Storage Battery Co.—F. S. Cassoway.
Gabriel Horn Mfg. Co.—S. Obermer, C. H. Foster.
Continental Rubber Works.—T. R. Palmer, G. C. Russel.
Kellogg Mfg. Co.—J. F. Weller, M. R. Anstice.
The Firestone Tire and Rubber Co.—H. S. Firestone, S. G. Carkhuff, R. J. Firestone, A. S. Partridge, T. J. Glenn, D. C. Swander, F. H. Martin, W. R. Walton, J. V. Mowe, W. F. West, C. H. Gerhold, O. J. Abell, C. E. Jackson, W. H. Bell, L. E. Sisler.
George A. Haws.—Michael J. Martin, Henry E. Haws.
Lebanon Steel Casting Co.—W. H. Worrilow, W. E. Farrell.
Apple Electric Co.—V. T. Apple.
Ajax-Grieb Rubber Co.—Wm. G. Grieb, J. C. Matlack, H. W. Stimpson.
Westchester Appliance Co.—H. M. Duncan.
Diamond Chain and Mfg. Co.—L. M. Wainwright, W. C. Roby, J. W. Spray.
The Wm. Cramp & Sons Ship and Engine Bldg. Co.—Courtland D. Cramp.
The Sprague Umbrella Co.—J. H. Sprague.
The Chandler Co.—L. J. Chandler.
Standard Roller Bearing Co.—T. J. Heller, F. M. Germane.
C. A. Mezger, Inc.—R. H. Montgomery.
Gray & Davis.—S. P. Moses, Wm. Gray.
Western Tool and Forge Co.—O. Refior, E. C. Conner.
Reichenbach Laboratories Co.—J. V. Lawrence.
Weston-Mott Co.—C. S. Mott.
C. Cowles & Co.—L. C. Cowles.
McCord Mfg. Co.—P. L. Barter, J. W. Caln.
Joseph Dixon Crucible Co.—Geo. E. Long, L. H. Snyder.
Morgan & Wright.—C. J. Butler, A. I. Philp, L. C. Weston, C. S. Shugart, J. W. Hobbs, T. R. Burton, H. H. Colbath.
G & J Tire Co.—B. C. Dowse, H. A. Githens.
Chicago Drop Forge and Foundry Co.—N. W. Dingwall.
Light Mfg. and Fdy. Co.—F. S. Brant, E. R. Cassel, E. S. Fretz.
Frost Gear and Machine Co.—C. M. Frost.
Continental Caoutchouc Co.—J. M. Gilbert, O. S. Tweedy, J. H. Sheldon, C. A. Gilbert, E. E. McMaster, R. R. Drake
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The Manufacturers' Foundry Co.—Ed. W. Beach, F. C. Fromm.
Hayes Mfg. Co.—H. J. Hayes, E. D. Emmons.
Vacuum Oil Co.—G. K. Bradfield, W. F. Kemball, F. B. Thurber.
The National Coil Co.—F. A. Wood, Harold Kellog.
The Whitney Mfg. Co.—W. W. Totman, H. L. Sevin, C. E. Whitney.
Vanadium Metals Co.—J. Rogers Flannery, V. C. Lassen.
Pennsylvania Rubber Co.—S. G. Lewis, Chas. M DuPuy.
The Timken-Detroit Axle Co.—H. W. Alden, A. R. Demory, E. W. Lewis.
National Tube Co.—J. G. Bateman, C. H. Wood, J. J. Dunn, E. Hollinger, J. J. Kennedy.
Warner Mfg. Co.—T. W. Warner.
Cleveland Speed Indicator Co.—W. R. Kissick.
The Royal Equipment Co.—W. G. Hoag, R. B. Curtiss.
The Diamond Rubber Co.—E. P. Weber, H. J. Woodard, E. H. Fitch, L. K. Rittenhouse, N. E. Oliver, C. B. Myers, J. Q. Goudie, O. J. Woodard, W. B. Miller, J. B. Braden, C. E. Mathewson.
The New York Edison Co.—H. Robinson.
Castle Lamp Co.—H. J. Quinn, F. E. Castle.
The B. F. Everitt Co.—W. O. Briggs.
Briscoe Mfg. Co.—J. A. Boyle, A. J. Kinnucan.
National Carbon Co.—N. C. Cotabish, A. E. Carrier.
S. F. Bowser & Co.—S. B. Bechtel, E. M. Savercool, A. Stata.
The Timken Roller Bearing Co.—W. R. Timken, E. B. Lansier, H. Ely, H. J. Porter, W. P. Culver.
The Sparks-Withington Co.—Wm. Sparks.
The Standard Welding Co.—W. S. Gorton, L. D. Rockwell, W. H. Pinovey, A. Bryon, E. I. Hemsolm, Chas. Miller, L. F. McClemen, T. L. Dodd.
Standard Thermometer Co.—F. W. Whitcher, Rollin Abell.
Baldwin Chain and Mfg. Co.—Wm. H. Gates, H. V. Greenwood, C. J. Ewens.
Consolidated Rubber Tire Co.—Van H. Cartmell, F. A. Seaman, F. E. Holcomb, E. S. Roberts, Otis Cook.
E. B. Van Wagner Mfg. Co.—E. B. Van Wagner, W. A. Clare.
Columbia Lubricants Co. of New York.—C. S. Stowe, Wm. B. Sheddan.
The Parish & Bingham Co.—Wm. Cairns.
The Stromberg Motor Devices Co.—W. R. Johnston, W. L. O'Neill.
The Michelin Tire Co.—J. A. Atwell.
Havoline Oil Co.—T. E. Tomlinson.
The Badger Brass Mfg. Co. of New York.—Lewis J. Keck, Wm. L. Yule, R. H. Welles, Ezra Kirk.
Claire L. Barnes.—E. J. Northwood, L. H. Loveland, W. H. Hitchcock, C. M. Hall, C. L. Barnes.
Billings & Spencer Co.—L. D. Parker, F. C. Billings.
Livingston Radiator and Mfg. Co.—E. G. Bruckman.
A. R. Mosler & Co.—A. R. Mosler, C. C. Boynton.
The Schwartz Wheel Co.—L. S. Bowers.
The Ferro Machine and Foundry Co.—D. R. Wilson, C. B. Wilson, J. A. Day.
Hayes Wheel Co.—C. B. Hayes.
The B. F. Goodrich Co.—W. H. Yule, W. O. Rutherford, A. J. Wills, G. O. Simpson, H. B. Limric, H. B. Niblette, E. A. Bedell, H. A. Price, H. E. Raymond.
The Seamless Rubber Co.—Warren Williams, E. H. Whitman, J. V. Alden.
J. H. Williams & Co.—H. Aikman, F. W. Trabold, J. H. Williams.
Janney, Steinmetz & Co.—J. A. Janney, Jr., J. A. Steinmetz.
Thermoid Rubber Co.—J. O. Stokes, F. S. Wilson.
Crucible Steel Co. of America.—C. F. Blue, G. W. Sargent.
The Dean Electric Co.—R. H. Manson.
Salisbury Wheel and Mfg. Co.—S. H. Penfield, E. D. Shearman.
A. O. Smith Co.—A. O. Smith, S. R. Smith, James S. Sinyard.
Kokomo Electric Co.—Chas. T. Barnes.
Weed Chain Tire Grip Co.—W. B. Lashar, H. R. Swartz, H. D. Weed.
L. C. Chase & Co.—J. Hopewell, C. F. Hopewell, F. B. Hopewell, James Clemens, Wm. Mailand, E. N. Clark.
The Electric Storage Battery Co.—Chas. Blizard, Albert Taylor.
Hancock Mfg. Co.—H. W. Hancock, F. E. Taylor.
Byrne, Kingston & Co.—J. W. Johnson.
Swinehart Tire and Rubber Co.—W. W. Wuchter, C. W. Moody, E. O. Hoofengamer, A. J. Greene.
The Jones Speedometer Co.—J. W. Jones, G. L. Holmes.
Medina Stamping Co.—H. W. Robins.
Empire Tire Co.—C. E. Murray, A. B. Cornell, W. G. Whitlock, C. H. Semple.
N. Y. & N. J. Lubricants Co.—J. H. Bennis, F. J. Barnes.
A. Schrader's Son, Inc.—M. C. Schweinert, T. O. Eckhardt.

C. F. Splitdorf.—P. J. W. Kelley, G. H. Murphy, W. J. Murray.
Auto Parts Mfg. Co.—A. W. Tyler, Jr.
Edison Storage Battery Co.—H. L. Davison, Hiett, W. G. Bee.
American and British Mfg. Co.—G. W. Hoadley, J. W. Goetz, D. B. Hill.
The Republic Rubber Co.—J. H. Kelly, F. G. Hill, B. C. Swinehart, S. G. Rigdon.
Kinsey Mfg. Co.—Isaac Kinsey.
Union Drawn Steel Co.—Thomas Towne, F. H. Bagle.
O. W. Young.—A. F. Kauffman.
Consolidated Rubber Tire Co.—E. J. Todd.
Dorian Remountable Rim Co.—F. L. C. Keating, Max Rosett.
Empire Tire Co.—M. R. Margerum.
Gemmer Mfg. Co.—G. E. Wilder, E. S. Hammond.
Auburn Auto Pump Co.—C. B. Penney.
Oliver Mfg. Co.—A. V. Martin, J. M. Sherwood, W. H. Oliver.
Western Tool & Forge Co.—E. S. Crosby.
B. F. Goodrich Co.—E. C. Tibbitts, H. K. Raymond.
The Hoffecker Co.—J. P. Hunting.
Booth Demountable Rim Co.—Martin Mullen, Geo. L. Dorr.
Brandenburg & Co.—G. B. Brandenburg, J. I. Brandenburg.

S. of A. E. Held a Very Successful Banquet

FOLLOWING the first day's business activities of the Society of Automobile Engineers, convening at the Automobile Club of America on January 11, the annual banquet was given to by far the largest number of members, and the most distinguished list of guests within the experience of this body. Before the banqueters sat down to the elaborate repast that was prepared for them under the direction of the efficient entertainment committee, the retiring president, Howard E. Coffin, made a few apropos remarks that were rendered the more brilliant, if possible, in view of their terseness and brevity; he sounded the keynote for harmony, and the carrying on of the work of the society with a view to the ultimate standardization of the materials used in automobiles, intimating that the prospects for the continuance of a vigorous campaign are in nowise threatened, and this idea is particularly entertained in view of the succession to the presidency of Henry Souther, and the continuance of the services of Coker F. Clarkson, whose work as general manager has attracted wide attention, and the fame of the society has spread through the plants devoted to the manufacture of automobiles and accessories everywhere. There will be no better way of pronouncing the splendid success of the society and the interest that is being taken in its work than to print here the names of those who were present and participated in the discussion before the banquet, and to say that they were readily persuaded to remain until the banquet was over.

MEMBERS AND GUESTS WHO DISCUSSED THE S. OF A. E. BANQUET

Guests

W. S. Leggett
C. W. Rice
David Beecroft
W. M. Sweet
J. S. Marvin
R. H. Randall
W. L. Marsh
E. Fried
F. C. Tygard
F. Burgess
R. Allerton
R. L. Morrell
H. O. Haight

Members

R. F. Russell
Frederick Charavay
A. R. Miller
B. V. Covert
Herbert Chase
Charles E. Lozier
Joseph Tracy
John A. Mathews
George W. Sargent
A. P. Sloan, Jr.
George K. Bradfield
T. V. Buckwalter
Ernest L. Smith
Thomas Prosser
W. P. Kennedy
W. E. Hogle
Geo. E. Hazard
A. L. Haskell
C. B. Wilson
A. C. Bergmann
R. P. Johnson
H. C. Wilson
Charles Hayward
J. A. Anglada
Bertram Bailey
E. T. Birdsall
J. Bijur
H. H. Brown
R. C. Carpenter
C. F. Clarkson
Geo. S. Case
H. G. Chatain
C. E. Clemens
Charles Cuno
H. F. Cuntz
R. S. Drummond
F. L. Eberhardt
H. F. Donaldson
Edward Ehler
H. E. Coffin
Herbert C. Colburn
C. E. Davis
A. M. Dean
B. L. Madden
Geo. P. Dorris
A. H. Doty
Burton G. Ellis
Thos. J. Fay
David Fergusson
Radclyffe Furness
Christian Girl
B. D. Gray
Wm. Gray
Otto Heins
Roger B. Whitman
Victor W. Kliesrath
Max Tost
J. S. Bretz
Frank H. Floyd
Chas. D. Shain
L. B. Alexander
P. M. Heldt
Henry Hess
M. R. Hutchison
F. R. Hutton
Edw. B. Jacobson
H. H. Kennedy
Jas. A. Kline
M. C. Krarup
Louis Krynitz
J. M. Lansden
A. L. McMurtry
C. S. Mott
Lars G. Nilson
A. J. Poole
F. H. Poor
H. L. Pope
N. B. Pope
Walter A. Frederick
D. F. Graham
Arthur A. Greenick
Wm. Hasselkus
M. L. Lothrop
W. V. Lowe
Ernest Lunn
Howard Marmon
C. E. Mead
Claire L. Barnes
Wm. H. Barr
H. A. Buzby
Clyde E. Dickey
A. R. Mosler
George E. Merryweather
F. E. Moskovics
R. E. Northway
Jesse T. Pratt
H. Vanderbeek
V. G. Von Rottweiler
Newton A. Wolcott
A. W. Morris
O. A. Light
H. G. Baldwin
F. E. Couch
D. A. McConnell
R. A. Radle
Fred. C. Burkhardt
Geo. B. Fuller
C. A. Neracher
I. Jay Shults
C. B. Hayes
J. H. Parker
Frank D. Carney
Clement Booth
Adolph L. DeLeeuw
Charles B. Whittelsey
Jas. C. Angelino
H. W. Alden
V. G. Apple
Jerome J. Aull
Wm. P. Barba
Wm. G. Bee
G. G. Behn
F. H. Berger
F. R. Boynton
W. H. Cameron
A. L. Riker
Edw. K. Rowland
Jos. Schaeffers
C. W. Spicer
H. M. Swetland
P. S. Tice
Enrique Touceda
Herbert L. Towle
Frank H. Trego
Wm. H. Tuthill
W. H. VanDervoort
Guy W. Vaughan
W. G. Wall
Thos. W. Warner
G. A. Wells, Jr.
W. C. Wenk
J. P. Wetherill, Jr.
A. H. Whiting
C. E. Whitney
E. R. Whitney
F. E. Whitney
E. C. Wilcox
E. S. Fretz
J. A. Halford
Leonard Kebler
Edward A. Ross
Wm. H. Son
Hy. A. Bugie
Wm. H. Brudi
Jos. W. MacKay
Chas. L. Schwarz
C. H. Wood
Chester S. Ricker
Wm. E. Carpenter
A. C. Gibbons
W. W. Totman
Thomas Towne
J. G. Vincent
L. M. Wainwright
Lawrence Whitcomb
Benj. B. Bachman
W. S. Kendrick
Chas. W. McKinley
E. R. Ritter
Henry Souther
J. C. Chase

Davenport Preparing for Its Annual Show

DAVENPORT, IOWA, Jan. 16—The Davenport Automobile Club will hold its second annual auto show in the Coliseum, Davenport, Iowa, February 9 to 12. There will be special decorations, music by a military band and special exhibitions on the stage, in addition to eighteen big exhibits on the main floor.

The show, coming as it does between the Chicago and Minneapolis exhibitions, makes it possible for manufacturers and dealers to exhibit their cars and chassis here.

Preparing for Brooklyn Dealers' Exhibition

A decorative scheme of unexampled gorgeousness is being worked out for the Brooklyn Automobile Show, which is to be held in the Twenty-third Regiment Armory from February 18 to 25, under the auspices of the Brooklyn Motor Vehicle Dealers' Association. Pal, the artist, who did the mural paintings at the Madison Square Garden Automobile Show, has been awarded first prize in the competition for a poster to advertise the show.

Troy Club Announces Its Show Dates

TROY, N. Y., Jan. 16—The Automobile Show to be held by the Automobile Club of Troy at the State Armory, Troy, during the week of January 30, gives promise of being one of the biggest industrial expositions ever held in Northern New York and practically every dealer of Troy and Albany will be represented.

Decoration and Equipment of Chicago Show Completed

CHICAGO, Jan. 16—The last detail of the scheme of decoration and equipment of the Chicago automobile show has been completed. Actual work on some of the material commenced three months ago and a great part of it is practically complete. No less than six decorating concerns are at work, the workmen including scenic artists, sculptors, staff makers, carpenters, sign makers, workers in papier mache, artificial flowers and art glass, plumbers, electricians, carpet-makers, and foresters.

So much favorable comment resulted from last year's garden scene with its giant trees, bronze railings and gates, brick walls and blue sky, that the management was loth to depart from it but finally decided to stick to its time-honored custom of a complete change in the main building. And so the English garden has given away to a French scene typical of the times of Louis XIV.

Perhaps the most striking features of the Coliseum display will be the ceiling and four gigantic fountains. The entire roof of the building, 300 by 175 feet, will represent stained glass supported on massive scrolls of bronze.

The main floor of the Coliseum is divided into four sections, each 113 by 47 feet. In the center of each section a fountain will be erected, 30 feet wide at the base and 38 feet high. The central column will be illuminated, as will also a huge lantern at the top. Water will fall in a four-foot column from a height of 28 feet. Stretching away to right and left, will illuminate shell-shaped vases, mounted 10 feet in the air on ornamental bases, each vase being about 6 feet high by 5 feet wide. Between them will be lamp posts bearing clusters of 12-inch and 16-inch lighted globes. The beauty of all these features will be enhanced by floral decoration.

At the aisle fronts of the central spaces lampposts bearing 12-inch globes and vases and real flowers will mark the entrance to the spaces. On the opposite side of the aisle, entirely covering the iron girders which support the building, massive pillars will extend from the floor to the gallery, each pillar about 18 feet high, of design to correspond with the fountains and other central features. These will support the ceiling, also of ornate construction, through which at intervals of 11 feet, will protrude 500-watt tungsten burners, this being the first demonstration on a large scale of this new light in Chicago. The illumination of the building as a whole will be more elaborate and more brilliant than heretofore.

The gallery will be similarly treated. The present seating will be covered by a temporary platform to accommodate exhibits of accessories. The scene along the front will correspond with the ceiling and at each truss, 24 feet apart, there will be an ornamental column with an illuminated cap. Running back from these columns will be ornamental panels which will enclose the iron girders. Similar effects will be produced on the three floors of the Annex.

But the splendid effects of last year have not been entirely discarded. Some of the exhibitors in the First Regiment Armory expressed a desire that the trees, gates, walls, railings and shrubs which made up the English garden, be transferred to their department of the show. With necessary modifications this will be done. Giant trees will be a feature of the central spaces—somewhat smaller than the 65-foot specimens used in the Coliseum last year but fully as large as the building can accommodate. Trees will line the gallery also.

St. Louis Exhibition a Big Society Event

ST. LOUIS, Jan. 16—The St. Louis Automobile Show, to be held the week of February 13 at the Coliseum, it will be strictly co-operative, with net profits returned to the exhibitors. The show committee, which has entire management, consists of one member, of proven competence, from every company exhibiting.

Every available space in the Coliseum has been taken, and there will be many different lines of automobiles shown, both in pleasure and commercial machines.

The Coliseum decorations will be on a gorgeous scale with a floral background and the entire ceiling and walls hung with a profusion of smilax. A long list of society ladies will act as patronesses, and their assistance will make it the big social event before the beginning of Lent.

Dates for Worcester Show

WORCESTER, MASS., Jan. 16—The Worcester Licensed Automobile Dealers' Association will hold a show February 1 to 4, and the choice of places has narrowed down to two. Space is already in great demand by leading auto accessory and supply dealers.

Arrangements are also being completed for special music, the decorative schemes and some unique and novel display effects in the electrical line.

Members of the Show Committee, with Walter L. Weeden, of Worcester, who has been selected to manage the show, were in New York for several days in attendance at the New York show and arranged for special features for the Worcester affair.

Space at Premium at Omaha

OMAHA, Jan. 16—Preparations for the Sixth Annual Automobile Show of the Omaha Dealers' Show Association are rapidly nearing completion. The show, which opens February 20, will be divided into three parts. On the main floor of the auditorium will be the pleasure vehicles; in the basement will be the commercial vehicles, and on the stage of the auditorium the accessories exhibit.

There will be thirty-eight exhibitors. Nine companies will exhibit motor trucks, and five automobile supplies.

Lack of sufficient space is the only thing that handicaps the dealers now. As there will be some sixty-five different makes of cars exhibited, and each dealer wants to show several models of each car, even the best arrangement of exhibits has failed to provide sufficient room.

Philadelphia Has Poor Show Facilities

Automobile exhibitions have become so important in modern commerce that they have outgrown all the buildings that have been used for the housing of the various shows all over the country, with one or two possible exceptions. In New York, Madison Square Garden is desperately pressed to accommodate the exhibitors of one wing of the industry; in Chicago, the annual display will have to be held in two buildings; in Detroit there is an overflow show as a protest against the lack of a suitable building, and the present exhibit at Philadelphia requires two armories to show the cars of only one section of the industry. One of two things must take place in the immediate future. Either the show idea will have to be curbed, with all that such a proceeding means to both manufacturers and public, or adequate buildings to accommodate the exhibitions must be erected. There can be no question as to the value of a vast exhibition hall to every first-class city in the land. The ability to house a national convention is a distinct asset to any city and is readily convertible into dividends. One of the uses of such convention halls would be the automobile shows, and such must be built in cities like Philadelphia, Detroit and other places where conditions are strained, and the good result that should be realized is put into jeopardy.

Central Ohio Agencies for 1911

COLUMBUS, O., Jan. 16—The following 1911 agencies in Columbus and central Ohio have been announced: F. E. Avery, 1199 Franklin avenue—Packard and Waverly in six counties. Robert F. Boda & Co., 25 North Fourth street—Mitchell in central Ohio and National in Columbus. Broad-Oak Automobile Company, 621 East Broad street—Chalmers and Pierce-Arrow in thirteen counties in central Ohio. Central Ohio Motor Car Company, 61 East Spring street—Olds and Oakland in central Ohio. Curtin-Williams Automobile Company—86 North Fourth street—Peerless and Cadillac in ten counties in central Ohio. Franklin Motor Car Company, 174 North Fourth street—Franklin, Owens, Reo and Inter-State in central Ohio. Charles Schiear Motor Car Company, 176 North Fourth street—Hupmobile in central Ohio. Early Motor Car Company, 177 South High street—Halliday and Herreshoff for Ohio and Rambler for central Ohio. John H. Howald, 172 North Fourth street—Buick and Welch in central Ohio. Fred Kaiser & Co., 38 West Main street—Bergdoll in fourteen counties. Studebaker Auto Company (branch), North Fourth street—Studebaker, E. M. F. and Flanders 20 in central Ohio. Adamson Auto Company, West Mound street—Jackson, Haynes, Lambert and Brush in central Ohio; also Lambert truck. Columbus Buggy Company, Dublin avenue (manufacturers)—Firestone-Columbus and Columbus Electric; United States Carriage Company, South Fourth street—Apperson and Great Eagle in central Ohio. R. C. Wescott, 972 North High street—Regal, Reading and De Tamble in central Ohio. O. G. Roberts & Co., 933 East Gay street—Overland, Stoddard-Dayton and Marmon for central Ohio. Snyder Auto Company, 765 East Long street—Abbot-Detroit in nine counties. Hudson Auto Company, North Fourth street—Hudson and American in central Ohio. Kimmell Bros., 170 North Fourth street—Speedwell and Badger in central Ohio. Ohio Auto Company, Goodale and Park streets—Ford in three counties. Cummins Auto Sales Company, North Fourth street—Elmore in central Ohio. United Motor-Columbus Company, 58 East Spring street—Maxwell and Columbia in central and southern Ohio and three counties in Kentucky. Williams and Schlereth, 755 East Long street—Wayne-Detroit in central Ohio. The J. I. Case Company, Vine street—Case in Ohio. M. Able, 165 North Fourth street—Baker Electric. The Warren & Southwick Company, Cleveland avenue—Ryder-Lewis and Garford truck. Reliance Truck & Garage Company, rear 112 East Broad street—Reliance truck. E. H. Huffman, 141 East Town street—International Harvester delivery wagon.

Minneapolis Dealers Organize

MINNEAPOLIS, MINN., Jan. 9—To promote the feeling of good will among automobile dealers in Minneapolis, a club has been formed which will be known as the Minneapolis Motor Club.

The officers of the club are R. J. Randolph, president; A. E. Thompson, and C. S. Marshall, vice-presidents; A. N. Smith, secretary and T. E. Horton, treasurer. The directors are F. J. MacArthur, A. F. Chase and H. S. Haynes. The club headquarters will be at the Dyckman hotel.

The club will hold contests, and for this purpose a committee was appointed with Harold Vorce as chairman. H. E. Wilcox of the Wilcox Motor Car Co. of this city was appointed chairman of the technical committee.

Anderson Co. Changes Name

DETROIT, MICH., Jan. 9—The corporate name of the Anderson Carriage Co. of this city has been changed to the Anderson Electric Car Co. The company has been in business since 1895 in Detroit, having been moved from Port Huron in that year. The new members of the directorate are C. M. Bacon, G. D. Fairgrieve and W. H. McFarland of Detroit and F. E. Price of Chicago.

Firestone Adds Big Rim Factory

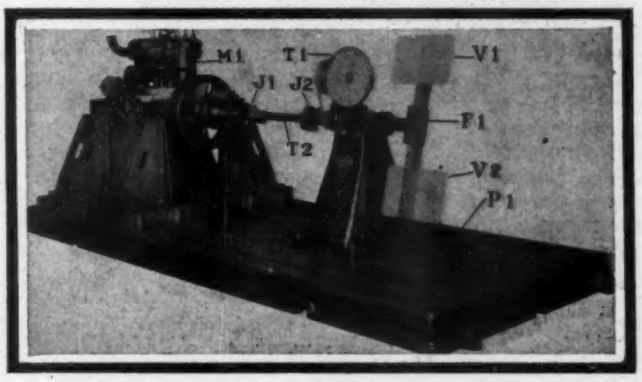
AKRON, O., Jan. 16—The Firestone Tire & Rubber Co. has gone into rim manufacture on a large scale in direct competition with the rim combine. This announcement was made at the New York Automobile Show by H. S. Firestone, president of the big tire company. Further, this company has completed the plant and it is now in operation.

National Opens Hoosier Branch

INDIANAPOLIS, Jan. 16—The National Motor Vehicle Co., Indianapolis, Ind., has opened a local branch in Indianapolis at 426 N. Capitol avenue, which will take charge of Indianapolis and Indiana business, and is in charge of B. M. Wiley, assisted by John D. Aitken, the latter better known as "Johnny" Aitken, who has made quite a reputation driving National cars in the various race meets for the past year or two.

Tracy Exhibits New Dynamometer

The new Tracy dynamometer, as here illustrated, is being exhibited at the Garden Show in the basement, and is attracting marked attention on the part of automobile engineers because of its rugged simplicity, and the wide range of service of which it is capable. Referring to the illustration, the motor M1 undergoing test rests upon adjustable pedestals and the crankshaft of the motor is connected to the dynamometer through the tumbleshaft T2 requiring the use of universal joints J1 and J2, leading to an outboard bearing which carries the fanshaft and the arm F1 to which is adjustably attached the veins V1 and V2. The tachometer T1 is belted to a pulley on the fanshaft, and this instrument, instead of being graduated in revolutions per minute, is calibrated to read in horsepower, there being one scale on the dial of the tachometer for each of the positions to which the veins V1 and V2 may be adjusted on the arm F1. Adjusting the veins outward in the radial plane increases the power required to propel the fan at any given speed, and it has been found in practice that this form of dynamometer offers a wide range of testing opportunities, so that the various types and sizes of motors may be quickly tested, and one of the points which should not be overlooked in the discussion of this dynamometer lies in the utility of the same for continuous loading of the motor, undergoing test. In discussing the details of the dynamometer with Mr. Tracy, he pointed out that the tachometer is calibrated at each of the allowable speeds, under the several loading conditions by means of an electrical equipment, and that the result obtained in this way reduces the possible error to that of the tachometer which is guaranteed to work with an error limit which is considerably less than 1 per cent. The equipment rests upon a heavy cast-iron platen so that an unbalanced motor running at a high speed is held down, and the operator is enabled to do his work under favorable conditions



Tracy fan-dynamometer for use in testing automobile motors, including a calibrated fan and a tachometer reading horsepower direct

Among the Accessories

SOME OF THE NUMEROUS UTILITIES SEEN AT THE BIG SHOWS THAT APPEALED WITH MORE THAN USUAL FORCE TO "THE AUTOMOBILE" REPORTERS

AT the recent shows many accessories designed to add comfort to the motorist and to make easy the performance of tasks that might otherwise prove irksome to the ease-loving were noticed by THE AUTOMOBILE reporters. Likewise many improvements on existing accessories and tools were in evidence, all designed to simplify, as far as possible, the various tasks that confront the autoist. The devices noticed below are a few of those which appealed forcibly to the newsmen.

Starting the Car from the Seat

Adapting the principle of the old Archimedes screw as it is applied to-day in automatic screw-drivers and wrenches, the Keen Starter Company, Inc., 66 West Forty-third street, New York City, has placed on the market a motor-starting device which admits of the starting of a car from the seat.

At the extreme front end of the car (Fig. 1) and bolted to the side frame member is a bearing bolt which holds the spiral bar at both ends. The rear end of the bar is idle, while to the front end of the bar is attached a small sprocket pinion. A long lever is attached to the side frame member at the driver's seat, and at the center of this lever is a shaft which connects with the male member of the screw which fits over the long spiral. From the sprocket pinion on the front end of the screw a chain is carried to a large sprocket wheel (Fig. 2) attached where the starting crank regularly is attached and utilizing the same shaft and pinion as is furnished regularly on the car. A backward movement of the lever turns over the motor just the same way as if it were being cranked by hand with a crank handle. It is claimed that the device eliminates all back-firing.

Handy Fasteners for Auto Upholstery

Broga Automatic Fasteners are designed for use anywhere that a fastener may be used. By that is meant that while primarily they are especially adapted to automobiles for the attaching of curtains, tops, tire cases, slip covers, etc., they may be used with equal facilities on carriages, leggins, coats, sleeping bags, tool bags, etc.

As may be seen in the accompanying cut (Fig. 3) the principle underlying the manufacture of these fasteners lies in a spiral coil

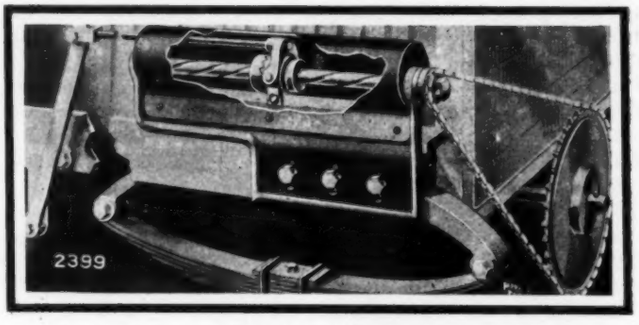


Fig. 2—Showing method of application of the Keen Starter

spring, encased within two concave plates forming a socket button so spaced as to allow the coil spring to expand and contract when passing over the head of a stud or post. The coil spring is in tension only during the act of fastening or unfastening the curtain. With the goods fastened the spring is in normal position with no strain on it at all. This insures long life and flexibility. These fasteners are designed with a wide and evenly distributed gripping surface of two plates which entirely eliminate any possibility of fastener tearing out of goods. When there is any wind or other strain, it pulls coil spring under shoulder of stud and automatically locks fastener in place, the harder the strain the more securely it holds, yet it operates as easily as buttoning and unbuttoning a coat. The smooth surface of the fastener also makes it possible to stamp thereon any desired emblem or trade-mark. The Broga Automatic Fastener Company, of Syracuse, N. Y., is the maker.

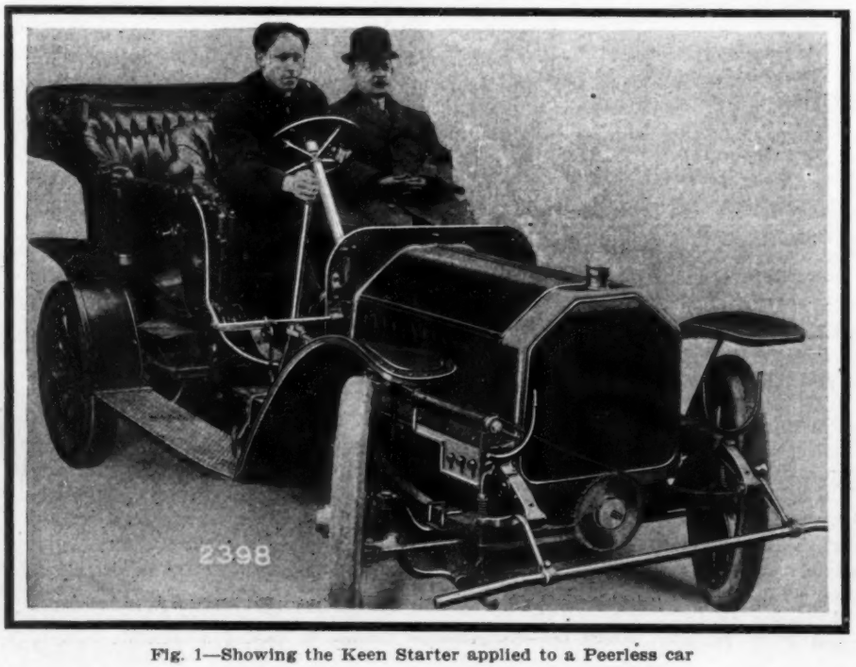


Fig. 1—Showing the Keen Starter applied to a Peerless car

Gas Tanks for Lighting Outfits

The accompanying illustration (Fig. 4) shows the outward appearance of the Victor gas tank, which embodies many new features in gas tank construction. A special form of internal construction gives a great amount of storing space for gas, and a special purification process is used which gives a clear white flame of purest quality. The end of the tank is welded in the shell by the oxy-acetylene process which makes the shell and end practically one piece. This insures the maximum of strength. The tank is regularly supplied in copper finish, highly polished, but when specially ordered can be furnished in nickel at a slight additional cost. Heavy stamped steel brackets are furnished which are equipped with a special, quick, attaching thumb nut, giving instantaneous adjustment. In the recess formed by the bottom is fitted a

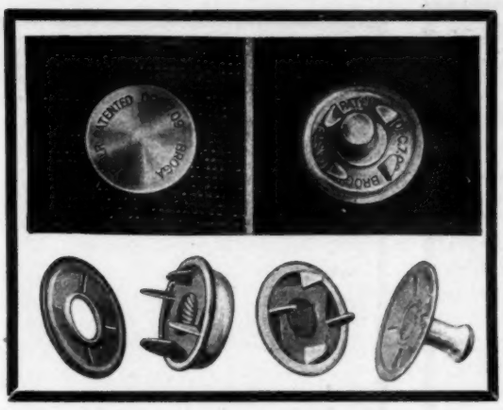


Fig. 3—Types of Broga fasteners

gauge to tell the amount of gas in the tank at any time, also a check on the proper filling from time to time. This tank is manufactured by The Compressed Gas Tank Company, of Canton, Mass. Two sizes are made, the larger for touring cars and the smaller for runabouts.

Friction Disc Windshields

No recognized principle of good mechanical construction and operation has been overturned in making Standard Friction Shields "original." The control is comprised of friction discs, the tension of which can be regulated to suit individual requirements. The shield is operated with the free hand, there being no set screws or lugs used in the adjustment (Fig. 5, 6 and 7). This construction is so rigid that no amount of vibration or wind pressure is sufficient to cause the upper half to topple over. Such little wear as may in time develop can be effectively taken up by tightening the nut at the outer surface of the cupped spring washers. These shields, which are simple in construction and pleasing in outline are made by the Emil Grossman Company, 232 West Fifty-eighth street, New York City.

Fig. 15 represents the Security windshield cleaner, another Grossman novelty. This device practically converts an ordinary shield into a rain vision shield. It consists of a clamp that grips the top of the shield in the manner indicated and the drop piece contains a rubber squeegee that expels the rain from the glass.

Fig. 5—Friction disc of Standard windshield

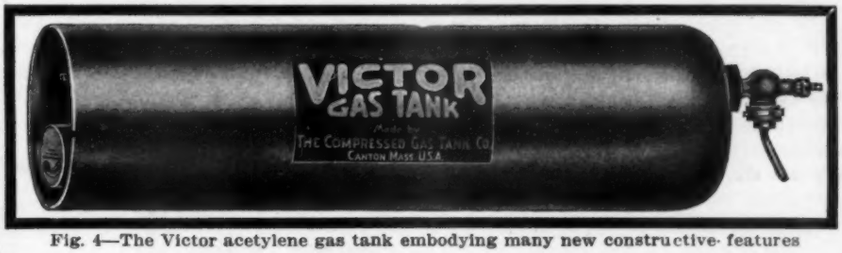


Fig. 4—The Victor acetylene gas tank embodying many new constructive features

A Sturdy Non-Skid Tire Chain

Tire chains are almost as necessary as the tires themselves. The Atlas chain, which is shown here in various types (Figs. 8, 9 and 10), is manufactured under five United States letters patent, and the company of the same name, which is located in Bush Terminal, Brooklyn, claims that this in no way infringes on any other non-skid device on the market. The principle of the device is similar to that of other chains on the market in that it consists of cross-members for preventing the skidding, held in place by standard chain side members. As will be noted in illustration, the cross chain is of the flat link type, especially designed with flat back and rounded edges so that it will not injure the tire. While the links themselves are of new and original construction, perhaps the most striking part of the whole chain is the corrugated center link, made of high-carbon solid steel, for which the makers claim great wearing properties, owing to the fact that this center link is not merely case-hardened on the surface, but is hardened all the way through. The cross chains are brass-plated and are a fine piece of mechanical work, having every appearance of being strong and powerful. As the company manufactures entire sets in all sizes and combinations, it has developed and perfected a side chain fastening device which, it is claimed, does away with the need of adjusters.

The old principle of fulcrum and lever has been ingeniously adapted to the needs of the case, the result being a powerful, yet simple fastener that takes up all the slack of the side chains, at the same time holding the cross chains snug and close to the tire, so that they are practically noiseless.

Simple Form of Headlight Igniter

Among the conveniences of the up-to-date automobile should be some means whereby the driver may be enabled to light his lamps

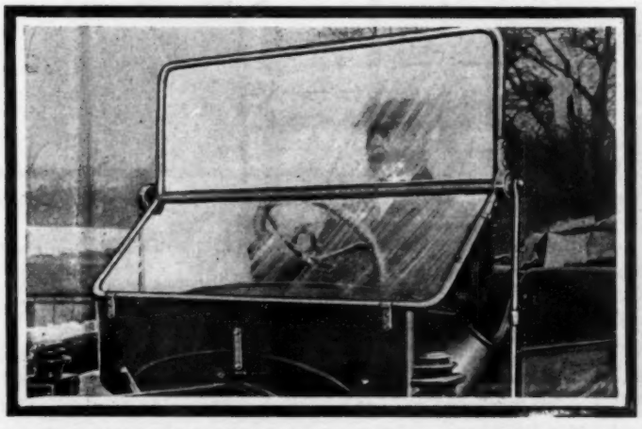


Fig. 6—The Zigzag type of Standard windshield

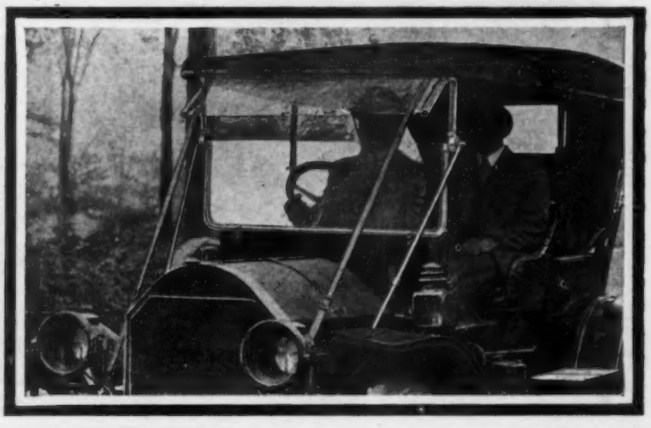


Fig. 7—The Rain Vision Vertical type of Standard windshield

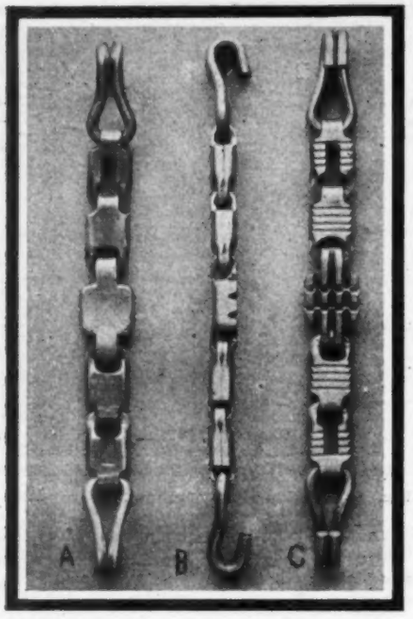


Fig. 8—Atlas Tire Chain. A—Section touching tire. B—Side view of cross chain. C—Road contact view of same.

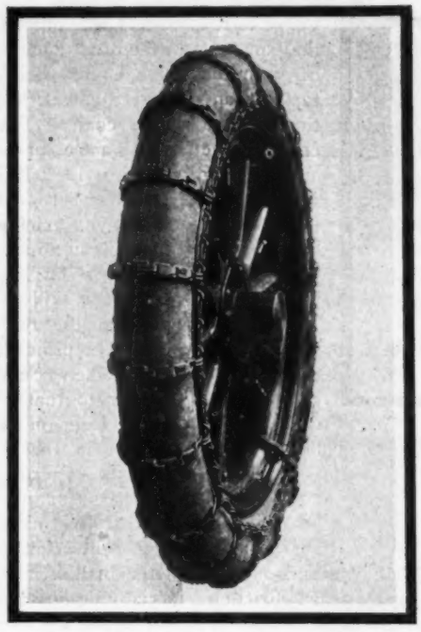


Fig. 9—Showing Atlas Tire Chain attached and ready for use

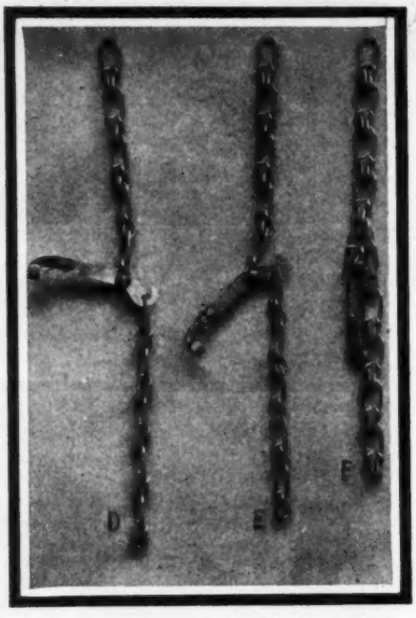


Fig. 10—Atlas Side Chain in various positions. D—Open. E—Half closed. F—Closed.

without the necessity of removing his gloves and fumbling about in his pockets for the generally elusive match. Such a convenience is the Koehler Headlight Igniter (Fig. 11) manufactured by the Champion Igniter Company, of Hudson, Mass. The device is simplicity itself. All that is necessary is to turn on the gas and pull a knob. There is no necessity for opening the doors of the headlights. The knob, which projects through the side of the lamp, actuates a striker which forms contact with the burner, causing a spark which ignites the gas, and then returning to its former position, ready for the next time the driver desires to "light up."

Clear Vision and Protection for Driver

That this is the age of specialization is an assertion that no one will attempt to deny. A concern that specializes on its product has an advantage over its competitors, greater proficiency following as the natural result. This is one reason for the popularity of the product of the Banker Wind Shield Company, of Pittsburg, Pa., which devotes itself exclusively to the manufacture of wind shields.

While these shields for 1911 will present no radical change in general design or appearance, close inspection will show many improvements in detailed construction. This is especially noticeable in the new automatic ball ratchet hinge (Fig. 12) of the double fold No. 2 shield, which, by merely raising or lowering the upper half, gives any desired angle, as well as a complete double fold over the hood, thereby making a shield to suit all sorts and conditions of weather.

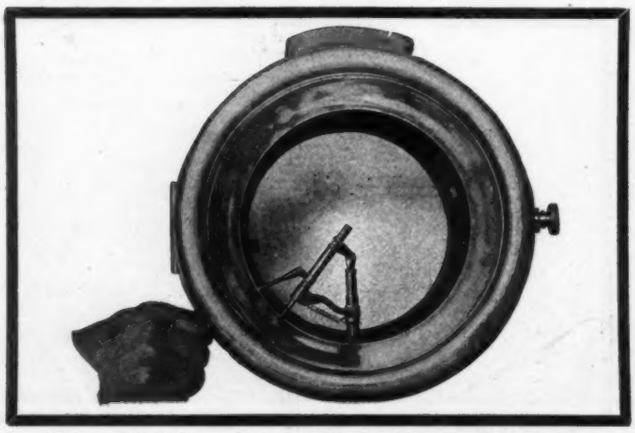


Fig. 11—Showing operation of the Koehler Headlight Igniter

The vexatious problem of giving a clear vision, with no metal strips across the glass to obstruct the driver's view of the road, has been solved by the use of channel shelves which support the glass, and at the same time by the setting of the upper glass fold one-quarter of an inch lower and forward of the lower glass fold, it absolutely prevents any possibility of the rain, wind or dust coming through, and also stops the whistling of the wind between the two plates of glass. The double fold over the hood is obtained by means of an expander placed inside the telescoping rods, and fitted at the end with a wheel that tightens or releases the tension as desired; the shield may be raised or lowered instantly without the driver leaving the seat. The filler board is cut, finished and ready to fit the particular type of car for which it is intended

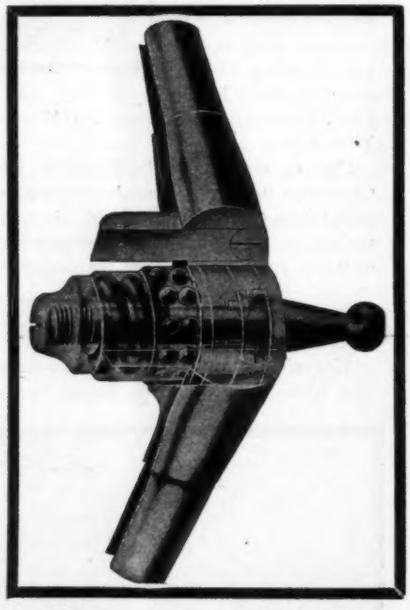


Fig. 12—Hinge of the Banker windshield

A Handy Ignition Self-Starter

The general use of the automobile and motor boat has created a demand for a reliable and satisfactory device for starting a gasoline engine without the labor and danger of cranking. This demand has caused thousands of ingenious engineers throughout

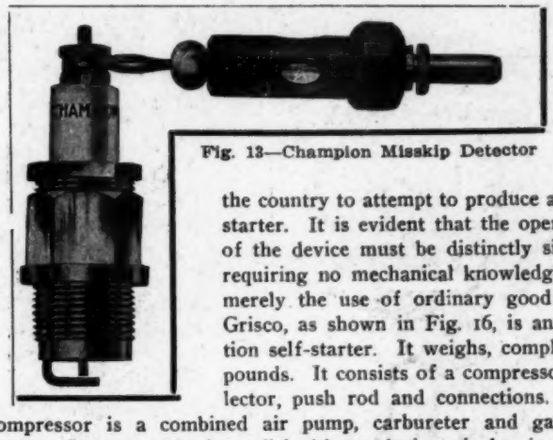


Fig. 13—Champion Misskip Detector

the country to attempt to produce a self-starter. It is evident that the operation of the device must be distinctly simple, requiring no mechanical knowledge and merely the use of ordinary good care. Grisco, as shown in Fig. 16, is an ignition self-starter. It weighs, complete, 6 pounds. It consists of a compressor, selector, push rod and connections. The compressor is a combined air pump, carbureter and gasoline holder. It is an attractive polished brass device 2 inches in diameter and 8 inches long. It may be placed in any convenient position on the floor or side of the car.

The tubular plunger contained in the compressor holds sufficient gasoline to start the engine about 150 times and is easily and quickly refilled. On the upstroke of the compressor air is drawn through numerous small holes surrounding the gasoline jet. This produces a perfect homogeneous mixture, of exactly the correct proportions of air and gasoline necessary to produce a strong explosive gas.

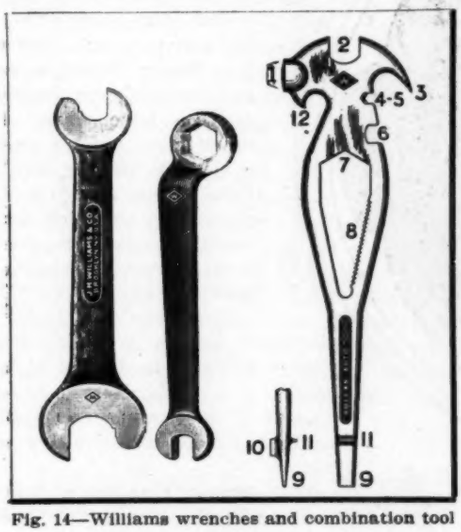


Fig. 14—Williams wrenches and combination tool

By the down stroke of the compressor this highly explosive gasoline mixture is forced into the connecting tubing to the selector, which in turn distributes it to the proper cylinders, where it is compressed. This produces the same result within the cylinders that would be obtained by spinning the engine and drawing in the charge through the engine carbureter.

The selector consists of highly polished brass valves 3-4 inch in diameter and 3 inches long. These valves, which are operated by a simple cam device, close the engine openings perfectly and leave absolutely no possibility of leakage or loss of power when the engine is running. They are screwed in the petcock openings on the cylinders and connected with the compressor by a 1-4 inch flexible copper tubing—a single line for the entire system.

The operation of the starter is distinctly simple, requiring no mechanical knowledge, and merely the use of ordinary good care. When stopping the engine and the electric current has been turned off, the operator must wait until the engine is through oscillating, then open the selector valves by pushing the lever B. This permits the compression in the cylinders to set the proper valves, thereby opening the passageway through the tubing from the compressor A to the proper cylinders. The device is manufactured by the Ignition Starter Company, whose factory is located at Grand Rapids, Mich.

Finding Missing Spark Plugs

The Champion Spark Plug and Misskip Detector is shown in Fig. 13. The detector is fitted to the spark plug in the manner shown, and in the glass window it is possible to ascertain whether the cause of misfiring is due to the plug or some other part of the electrical equipment. With each detector is supplied an instrument sheet and from this it is possible by the color and adjustment of the gap to tell the cause of any trouble. They can be fitted to any plug. The detector and plug are manufactured by The Champion Spark Plug Company in its completely equipped factory at Toledo, Ohio.

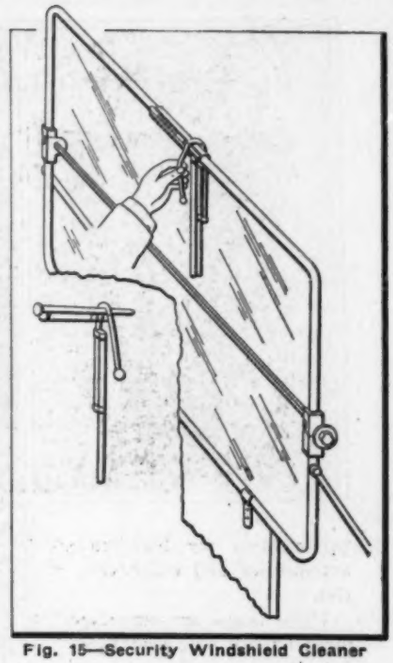


Fig. 15—Security Windshield Cleaner

Wrenches for Every Purpose

The three tools illustrated in Fig. 14 are the product of J. H. Williams & Company, of Hamilton avenue, Brooklyn, N. Y., and include the combined spark plug and tire lug wrench, the Williams ratchetless ratchet wrench, which allows the short side of the jaw to roll off on the back stroke and release the other jaw from opposite flat in one motion and is reversible by simply turning the tool over. The Williams' "Vulcan" auto tool is a high-class drop forging and the parts numbered perform the duties of the following tools: 1, hammer; 2, tire lug wrench; 3, cotter pin puller; 4, gas tank wrench; 5, wire insulator scraper; 6, air tank wrench; 7, spark plug wrench; 8, alligator wrench; 9, 10, 11, cotter pin spreader and three screw-drivers; 12, bottle opener.

All-Glass Lamps for Automobiles

The lamps shown in Fig. 17 are made from one solid piece of glass, no metal. It requires thirty days to anneal this glass so that it will stand 1,000 pounds pressure. The back of the glass on side lamps is frosted so that they do not reflect back and still retain their appearance. They always look bright and will stand severe usage.

These lamps, notwithstanding the fact that they are all glass, possess the following advantages: First, there is no metal to clean and they will pay for themselves in a short time in cleaning compounds and hours spent in polishing; second, there is no grease or dirt, the lamps being always bright and beautiful; third, they will stand more severe usage than the ordinary lamps now in general use; fourth, being annealed cut-glass, they are without doubt handsome and a most appro-

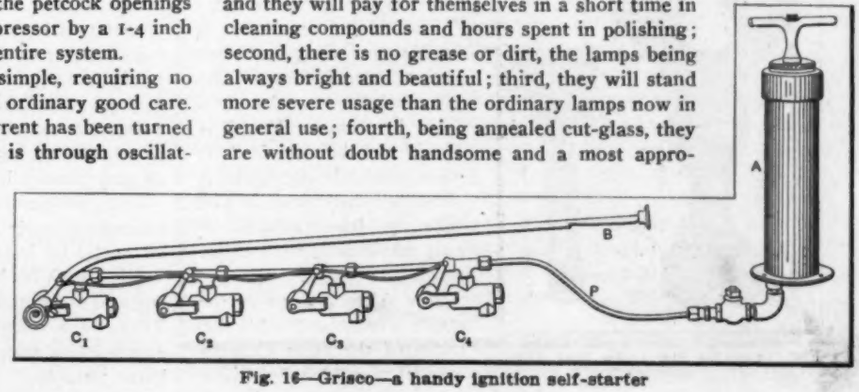


Fig. 16—Grisco—a handy ignition self-starter

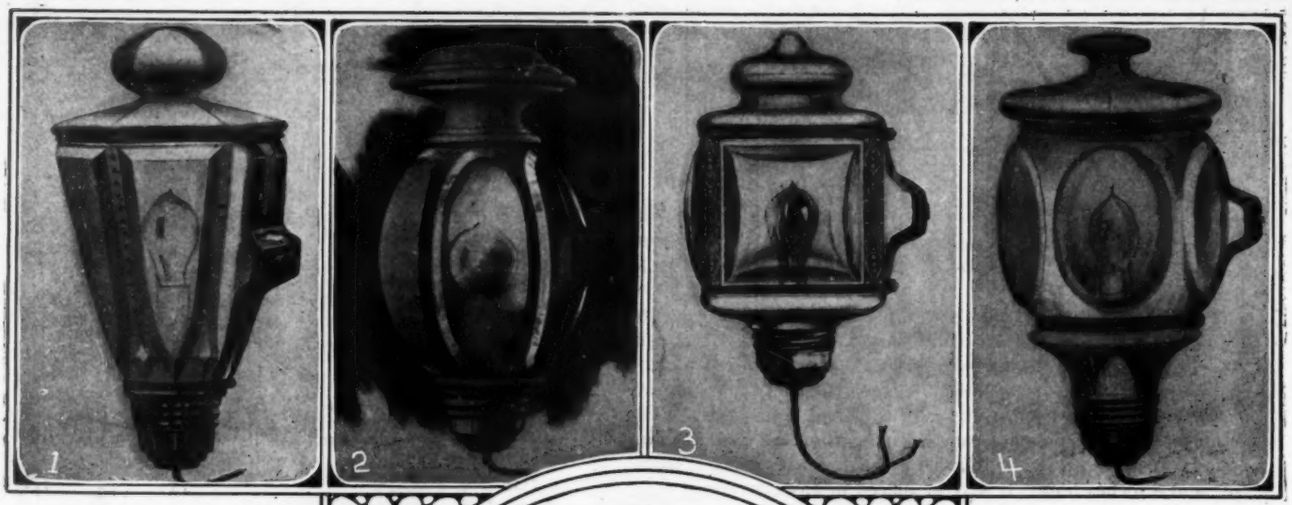


Fig. 17—Showing several styles of Luxfer Prism all-glass lamps

priate lamp for high-grade automobiles and other vehicles.

These lamps are manufactured by the American Luxfer Prism Company, Heyworth Bldg., Chicago.

Burners for Acetylene Lighting

To meet the demands of both the automobile and the house-lighting fields the American Lava Company, of Chattanooga, Tenn., has placed on the market five different burners, known as the German Lava Alco No. 12, Alco De Luxe, Turn-Down Hilo De Luxe, Brass Arm Ambo and Single Flame Duro (Figs. 18 and 19). The material used in the manufacture of these burners is known technically as German steatite, mined from the Fichtel Mountains in Bavaria.

The patent which covers the superstructure of these burners includes supplementary air holes and a process by which sufficient air is supplied by the burner to the gas so that when the flame is reduced combustion is supported without carbonization.

All of these burners are manufactured in four standard sizes —1-4, 1-2, 3-4 and 1 cubic foot, although on special specifications the intermediate sizes can be furnished.

The Alco De Luxe is a double arm burner of superior manufacture. The pillar is lathe turned from a solid hexagon rod and is highly nickel finished. It is of standard height and fits all American lamps. The hexagon base admits of easy instalment, with either wrench or pliers.

The Alco No. 12 is the staple standard burner, made of the same German lava as the Alco De Luxe. It is a two-arm burner mounted on a rolled round brass pillar with either plain or corrugated base.

The Turn-down Hilo De Luxe consists of a genuine lava burner thread screwed and cemented into the hexagon De Luxe pillar. The construction of this burner is identical with the Alco De Luxe except as to the supplementary air holes, which admit of burner being turned down without producing a smoking flame.

The Brass Arm Ambo, as the name implies, is a full brass burner with lava tip instead of lava arms. It is designed to meet the demand of the consumer who does not want a more expensive lava arm burner.

The Armless One-Flame Slotted Duro has a single-flame tip. There are no gas holes, the flame being produced by a single slot. This burner is not equal either in candlepower or life to the two-arm burners, in which provision is made for the mixture of air and gas to prevent carbonization. The company manufactures this burner simply to meet the demand, the argument in its favor being that it is easily cleaned and is very cheap. This company contends that all acetylene gas burners are really miniature Bunsen burners, and that the air let into the mixing chamber of the burners really mixes with the acetylene gas, supplying sufficient oxygen to produce a non-carbon flame, just the same as in a Bunsen burner.

The company manufactures every style and design of acetylene burner on the market, both for house lighting and for automobile use. There are upward of a dozen styles adapted to the latter purpose.

Fig. 18—Hilo De Luxe and Duro burners

Fig. 19—Ambo and Alco No. 12 burners

News of Maker and Dealer in Many Fields

DETROIT, MICH., Jan. 16—The Flanders Manufacturing Company, with a capitalization of $2,250,000, was incorporated last week, with Walter E. Flanders, president and general manager of the E-M-F Company, as the moving spirit. The new company will bring together five plants, merging them into one big manufacturing company. These are the Grant & Wood Manufacturing Company, of Chelsea; Pontiac Motorcycle Company, Pontiac; Pontiac Drop Forge Company; Pontiac Foundry Company, and the Vulcan Gear Works, recently moved from Detroit to Pontiac. The Grant & Wood company will continue the manufacture of automatic multi-spindle screw machines, screw machine products and steel balls for bearings. The principal output of the Pontiac factories will be motorcycles and automobile parts. It will produce "bi-mobiles," a two-wheeled machine of unique design, the details of which have not yet been made public, and tri-mobiles," or three-wheeled automobiles, for light delivery purposes. Directors of the new company will be Walter E. Flanders, Dr. James B. Book, William T. Barbour, president Detroit Stove Company; Clement Studebaker, Jr., South Bend, Ind., treasurer of Studebaker Company and E-M-F Company; John T. Shaw, president First National Bank, Detroit, and Arthur O. Smith, Milwaukee, head of the A. O. Smith Steel Works. The active officers will be: President, Robert M. Brownson, formerly secretary-treasurer of the E-M-F Company; vice-president, A. O. Smith; secretary, James B. Book, Jr.; treasurer, Harry L. Stanton.

Another deal involves the sale of the property and business of the K-R-I-T Motor Car Company to a syndicate headed by Walter S. Russel. The company is capitalized at $250,000, and the new organization acquired the unissued stock at par. Mr. Russel is chairman of the new board of directors, and Lawrence Moore is president and general manager, succeeding W. S. Piggins. E. C. Daughty gets F. W. Kanter's place as secretary, and for the present will act as treasurer, B. C. Laughlin retiring from that position. Kenneth Crittenden, designer of the car, will continue at the head of the engineering department, and also as vice-president.

Parry Plant in Full Swing Again

The Motor Car Manufacturing Company is the name of the new concern which will operate the plant of the defunct Parry Automobile Company, of Indianapolis, Ind. The officers of the new organization are: W. C. Teasdale, Jr., president; G. O. Simons, vice-president and superintendent; W. K. Bromley, secretary, all of Indianapolis, and Fred C. Dorn, and Frank H. Teagle, of Cleveland. W. C. Teasdale, Jr., was formerly connected with the Parry Automobile Company without a money interest in it. Mr. Simons came from the Dayton Motor Car Company, and F. C. Dorn is the well-known treasurer of the American Ball Bearing Company of Cleveland. F. H. Teagle is represented to be a director in the Standard Oil Company. The new company looks like a strong organization, and with the well-known Parry work as a basis for its future operation, it promises to look after the old Parry dealers, and to give to Parry owners the special service to which they have been accustomed. The line of cars for this year will range in prices between $1,350 and $1,750.

Alumaloyd Products Company Formed

CANTON, O., Jan. 16—The Alumaloyd Products Company, of Canton, O., a $250,000 company incorporated under the laws of Ohio, has purchased the process, good will and plant of the alumaloyd sheet department of the Stark Rolling Mill Company, of Canton.

The transfer of the business took effect on January 6, 1911, and upon the completion of the new plant on the outskirts of Canton the business will be expanded to meet the demand.

R. A. Bartholomew, formerly head of the alumaloyd department of the Stark mills, has been elected president of the new company. The general offices of the company have already been established in Canton.

The product of the Alumaloyd Products Company is a sheet metal with an aluminum coating, designed for motor car bodies of every type and description.

Quakers Starting New "Gasoline Row"

PHILADELPHIA, Jan. 16—As further confirmation of the fact that a second "row," promising in the not very distant future to run a close second to North Broad street, is springing up in West Philadelphia, in the section immediately west of the Schuylkill River, is the announcement that a reinforced concrete garage, four stories in height, with a basement, is to be erected at Nos. 2314-16-18-20-22 Market street, for Atlee & Donredore. The building will front 78 feet on Market street, having a depth of 107 feet to Ludlow street, where the structure will have the same frontage. Upon completion it will be occupied by the Locomobile Company of America.

Automobile Catechism Out

Forrest R. Jones, the Author, Has Rewritten the Same, Bringing It Up to Date

WITH 264 pages, including index, the third edition of the Automobile Catechism is off the press of the Class Journal Company, 231-241 West 39th street, New York City, and for the automobilist who has just joined the ranks it is a mine of information in such simple form that he will be able to settle all of his little problems with no greater difficulty in absorbing the necessary information than would be encountered in reading the daily paper. The book is of convenient size, bound in flexible Morocco, with gilt edges, and appropriately inscribed. The author's style is direct, and is noted for its clearness. The book opens with the caption, "Motor Parts and Functions," continues on in a logical way, dealing with all the problems of operation, holding the interest of the reader from start to finish, telling about all the things that must be known by the automobilist if he is to enjoy his car and keep cost down to a minimum. The illustrations, of which there are 102, are appropriately selected, beautifully engraved by the wax process and telling in effect. The cyclic relations of motors are clearly explained in simple language, and so plainly illustrated that the reader is placed in a position to appreciate the whole situation at a glance, and ignition problems are handled with a clearness that must appeal to the man who realizes that fully one-half of all the troubles that motors fall heir to are due to ignition defects. The problems of carburetion are illustrated and word-pictured for the man who wants to know, rather than for the edification of the expert. All kinds of valve troubles are gone into both by way of illustrations and through a series of logical questions and answers. Taking the book as a whole, it should be of great interest to the man who has a wide training in motor work, because of the exactness of the explanations of all operating problems, entire absence of useless wording, and the logical method of setting down the subject-matter. The book is not only a complete compendium for the owner of a car, whether he is experienced or not, but an index of no mean value to the engineer who desires a means for ready reference in every-day work. The price of the book is $2.50.

Latest Accessory Projects

MANY of the makers of automobiles have such close connections with the concerns which are devoted to the production of chassis assemblies that the makers are justified in contending that the parts plants are specialized departments which may be relied upon to produce assemblies strictly up to the design submitted; but it is also the practice in these undertakings to maintain inspectors from the respective automobile plants constantly upon the ground, and it is the duty of these inspectors to examine the materials used, and to check up the work piece by piece as it comes through, ending with the testing of the assemblies for the purpose of establishing their noiseless and efficient operation.

The interest which is now being taken in 1911 work by the intending purchasers of automobiles is sufficiently keen to warrant the reproduction of some of the assemblies which are being turned out, and for purposes of illustration a selection has been made of four units as manufactured by the Warner Gear Company of Muncie, Ind., and referring to Fig. 1 of a multiple disc clutch it will be observed that it is of relatively large diameter, bolted to the flywheel, and that 23 discs of asbestos fabric are used in conjunction with the required number of metal discs. The housing is tight, and the clutch spring has nine wraps, it being of round wire of sufficient diameter to exert a a considerable pressure, and this illustration seems to indicate that the dry plate clutch, so called, is being perpetuated, but that the number of plates has been very materially increased. The general character of workmanship is on a distinctly high plane.

Referring to Fig. 2 of an axle-swung transmission gear it will be observed that annular type ball bearings are used at every point, and that thrust is compensated for by means of thrust ball bearings. The prime and lay shafts are of large diameter and relatively short; the lay shaft is splined as well as the prime shaft, and the gears are fashioned similar to the sliding gears, but they are prevented from sliding by means of tubular spacers. The differential gear-set is of the beveled type, and compact, and the jackshafts have square ends which engage with broach holes in the suns of the differential set. The designer in this case was actuated by motives of simplicity and he must have kept in mind the broad necessity of maintaining a low unsprung weight in view of the location of the transmission gear as a part of the rear axle, and a further study of the design brings forth the remaining essential, i. e., noiselessness is a grave necessity, and the little trinkets which formerly adorned transmission gears are conspicuous by their absence in this case.

Still another example of good designing is shown in Fig. 3, presenting a transmission gear-set swung on the rear axle with the differential and bevel drive sectioned in order to bring to light the use of roller bearings and the excellence of the relation of the members. The differential gear is of the bevel type and the jackshafts have square ends which engage with broach holes in the suns. The bevel gear is of symmetrical design and is fastened to the flange of the differential housing by means of studs, and they are prevented from backing out through the interference of a wire which is threaded through holes in the hexagon heads of the studs. This simple plan of locking obtains at every point.

Referring to Fig. 4 of another example of a transmission gear in combination with a live rear axle, it will be observed that the three-speed selective type of transmission gear is of compact form, along lines involving economies in the spacing of members without infringing upon the requisite clearance, and the unusual feature of this unit lies in the placing of the multiple disc clutch in combination with the transmission gear and the live rear axle. The clutch is of the type using asbestos fabric in combination with metal plates, and the methods of matching the relating members is one which enjoys the distinction of being ingenious. The roller bearings which are used throughout in this example are protected against foreign matter.

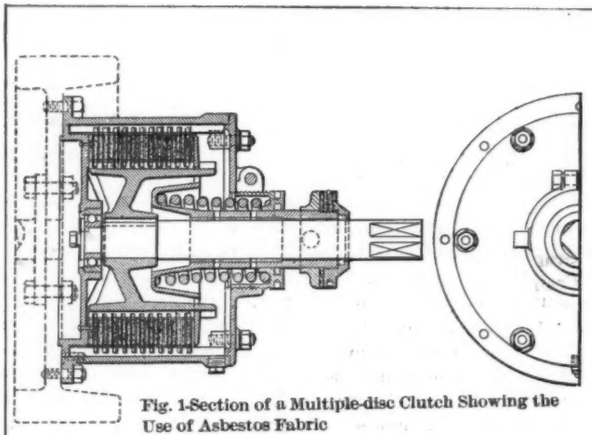


Fig. 1-Section of a Multiple-disc Clutch Showing the Use of Asbestos Fabric

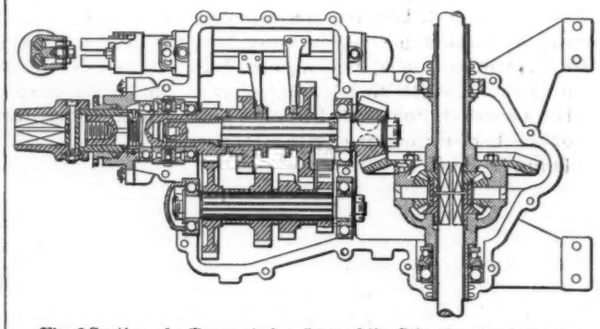


Fig. 2-Section of a Transmission Gear of the Selective Type Showing Direct Drive on High Gear

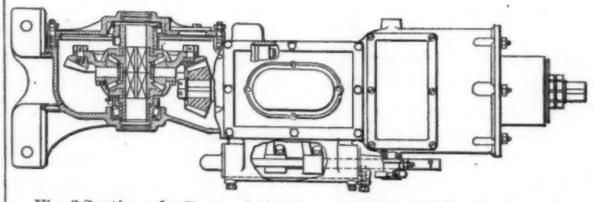


Fig. 3-Section of a Transmission in Combination With the Rear Axle

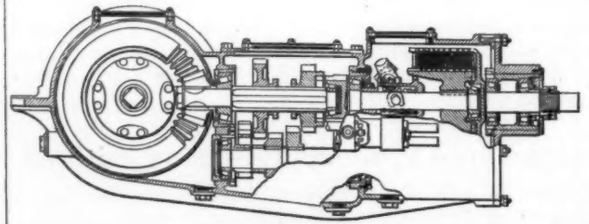


Fig. 4-Section of an Axle Transmission Embodying the Clutch and Differential